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ABSTRACT

Intended for the laboratory session of a 2-credit course on science and engineering information, this workbook introduces upper level undergraduate and graduate students to traditional and computerized library resources. Initially it presents the student with the basic information tools used to locate books, magazines, and journals, and includes exercises on the card catalog and serials listings. It proceeds to cover information tools used to identify papers published in the science and engineering literature, including magazines, journals, proceedings, and conferences, with exercises using the major indexing and abstracting sources. Finally, it exposes the student to the newer nontraditional approaches of accessing information and utilizes online computer searching exercises to teach bibliographic database techniques, concentrating on the DIALOG system and the NTIS database. An appendix provides samples of an online search and an offline computer printout. The workbook concludes with a listing of 66 subject guides to the literature of science and technology and a bibliography of 81 references. (Author/RAA)

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ED205178

INFORMATION RESOURCES

IN THE SCIENCES AND ENGINEERING

A LABORATORY WORKBOOK

Alfred Hodina

Robert Sivers

Virginia Weiser

Arthur Antony

SCIENCES - ENGINEERING LIBRARY

UNIVERSITY OF CALIFORNIA

SANTA BARBARA, CALIFORNIA

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3

Preface

This Workbook traces its beginning back to the Fall quarter of 1976 when the authors, all librarians in the Sciences-Engineering Library at the University of California at Santa Barbara, began offering a two credit course on Information Resources in the Sciences and Engineering. The course concentrated heavily on computer searchable bibliographic data files and was directed primarily to upper level undergraduate and graduate students. Partial support was provided from the National Science Foundation through a grant to the Algebra Institute, an organized research unit on campus. The support provided the authors some released time from their normal librarian duties to plan and teach the course.

In addition to the Library, a number of campus science and engineering departments were also involved in this NSF funded project. The purpose was to develop a curriculum design for using computer searchable information files in classroom instruction. The Science-Engineering Library's role was central to the project because of its earlier involvement with online bibliographic data bases. In addition to the computerized element, the Library's course also covered traditional library resources. Exercises on both the computerized and traditional resources therefore are included in this Workbook. Some changes in the course have been made since it was first offered in 1976, but the basic design and instructional format of lectures, laboratories and tutorials remain unchanged.

Up until the Fall of 1978, little thought had been given to developing a formally organized workbook of exercises. The incentive for producing one came when the Algebra Institute received additional funding from the National Science Foundation to develop and prepare instructional materials based on the experiences of the curriculum design project.

The gestation period for the Workbook was about two years. Revision, testing and editing of the exercises was done right up to the time of publication. Since the state of the art of online computerized searching was changing so rapidly, it was necessary to revise those exercises and sections more frequently. In testing the exercises, it was found that some were more effective than others, and several of the less effective ones, after considerable redesign and testing, were finally withdrawn from use.

In preparing this Workbook, the authors had the assistance of many students who provided valuable classroom feedback with regard to the effectiveness of the exercises. To these students the authors are greatly indebted for their suggestions and for their participation in the testing of the exercises.

In preparing the manuscript, two individuals deserve special recognition; Miss Sylvia Hudson for assisting in the evaluation and selection of type fonts used in the manuscript, and Miss Kimberly Dauphin for her expert and careful typing of the manuscript.

It is a pleasure to acknowledge the support and cooperation of the Algebra Institute with whom the projects were carried out. And particularly the authors are indebted to Drs. Marvin Marcus and David Simonett, the projects' principal investigators, for their encouragement and for involving us in their programs without which this Workbook would not now exist.

Introduction

Science information is as essential for scientific progress as food is for human survival. Neither can survive and prosper without access to the needed resources which nourish and sustain both the scientific and human potential.

The principal product of scientific research is science information. Much of the effectiveness of today's research depends on the efficiency with which this information is communicated and used. In recent years the unprecedented growth of scientific research and development has produced and continues to produce a plethora of science information, and there is every indication that this trend will continue in the future. Students who know how to access this vast store of science information will no doubt find such knowledge very useful in their school work, but the more significant effects will be realized later in their professional careers.

The laboratory exercises in this Workbook are an integral part of the course Information Resources in the Sciences and Engineering. One component of the course consists of a lecture section in which theory and the basic communication and information concepts are taught and discussed. The other component, which this Workbook supports, consists of laboratory sessions where students are introduced to the applied aspects of information retrieval. The instruction includes exposing students to hands-on use of a number of traditional and computerized information resources. A close relationship between the lecture and laboratory sessions exists, for it is vitally necessary that the applied aspects of information access and retrieval have a sound foundation based on theory.

Recently, a growing number of abstracting and indexing services began marketing their bibliographic files in computerized form. Accessing science information by computer will become increasingly more important in the very near future. Thus, a considerable number of the exercises in this Workbook are on accessing these new online services. The remainder of the exercises are on accessing the traditionally published science information resources which will continue as an important and the prominent form in which information will be made available. Each is important and neither should be forgotten when seeking out science information.

The exercises in the Workbook have been organized to allow students to build upon previous experience. Thus, Part I treats the basic information location tools which are used to locate books, magazines and journals in the library. Exercises on the card catalog and the serials listings are included in this part. Part II covers the information tools centrally used to identify papers published in the science and engineering serial literature, including magazines, journals, proceeding and conferences. Exercises on the major indexing and abstracting sources are included in this part. Part III exposes the student to the newer non-traditional approaches of accessing information. A number of online computer searching exercises are included that teach the students the basic techniques needed in searching computerized bibliographic data bases. An

appendix has been added as Part IV and contains samples of an online computer search and an offline computer printout. Finally, to encourage and stimulate students to further explore the aspects of science information access, several pages of additional reading sources have been added.

It has been our experience that students who take this course are often motivated in pursuing specific interests or topics. Therefore, many of the exercises were specifically designed to encourage and further the interest of students in selecting and pursuing subject search topics related to their field.

It should be remembered however, in using this Workbook, that the science of accessing and retrieving science information is a dynamic process and one that will no doubt necessitate frequent revision of some of the exercises contained in this manual. The authors would appreciate any comments or suggestions concerning the exercises, and for this reason we have included in the Table of Contents the names of instructors who have developed specific parts.

Objectives are an important part of any instructional program. At the completion of the course, students are expected to have a sound understanding of accessing science information. In particular, they should be: 1) familiar with the basic techniques for the retrieval of science information from traditional library resources such as the card catalog and serials listing, science indexes and abstracts, and other reference resources; 2) familiar with the nature of bibliographic information retrieval via computerized data bases; 3) able to make intelligent choices among the more important available information resources to satisfy specific information needs; 4) have some knowledge of major trends in science information retrieval especially with regard to future impacts.

As instructors in this course, we have found that these objectives were readily reached by our students. It is our hope that these objectives provide the substance for building a strong and sustaining base from which students can draw upon during their school years and beyond.

Table of Contents

	Page
Preface - *Alfred Hodina*	iii
Introduction - *Alfred Hodina*	v
Part I: Information Location Tools	1
Introduction : Information Location Tools - *Virginia Weiser*	2
The Catalog Card and Card Catalogs - *Robert Sivers*	3
Card Catalog Exercise - *Robert Sivers*	9
The Serials Listings - *Alfred Hodina*	11
Serials List Exercise - *Alfred Hodina*	13
Part II: Information Control Tools	15
Introduction: Information Control Tools - *Alfred Hodina*	16
Introduction to Abstracts and Indexes - *Arthur Antony*	18
Abstracts and Indexes Exercise - *Arthur Antony*	19
Abstracts and Indexes in the Physical Sciences - *Alfred Hodina*	21
Abstracts and Indexes in the Physical Sciences Exercise - *Alfred Hodina*	23
Abstracts and Indexes in the Earth and Environmental Sciences - *Robert Sivers*	27
Abstracts and Indexes in the Earth and Environmental Sciences Exercise - *Robert Sivers*	32
Abstracting and Indexing Services in the Life Sciences - *Virginia Weiser*	36
Abstracting and Indexing Services in the Life Sciences Exercise - *Virginia Weiser*	39
Part III: Computer Searching	47
Introduction : Computer Searching - *Robert Sivers*	48
Online Computer Searching: First Overview--Part I - *Robert Sivers*	50
Online Computer Searching: First Overview--Part II - *Robert Sivers*	52
Basic Techniques of Computer Searching Using Lockheed's DIALOG System--Part I - *Robert Sivers*	64
Basic Techniques of Computer Searching Using Lockheed's DIALOG System--Part I: Exercises - *Robert Sivers*	76

Page

Basic Techniques of Computer Searching Using Lockheed's DIALOG System--Part II - *Robert Sivers* 79

Basic Techniques of Computer Searching Using Lockheed's DIALOG System--Part II: Exercises - *Robert Sivers* 93

The NTIS Database - *Arthur Antony* 95

The NTIS Database: Exercises 1-8 - *Arthur Antony, Alfred Hodina, Robert Sivers* 97

Part IV: Appendix 105

Sample Online Computer Search 106

Sample Offline Computer Printout 111

Guides to the Literature - *Arthur Antony* 113

Bibliography - *Arthur Antony* 121

PART I

INFORMATION LOCATION TOOLS

Introduction: Information Location Tools

The main information location tool in a library is the card catalog. Some libraries have printed book catalogs. In others, the catalog is on microfilm. As the electronic age develops, the online catalog most likely will be the patron's access to a library's collection, by means of remote computer terminals. The card catalog is the index to published works held by a library. In this respect it is sometimes known as the "key" to the holdings of a library. It is analogous to the index at the end of a book.

The arrangement of the cards is in alphabetical order by authors' names, by titles of works, and by subjects which define the works. All three aspects may be intermingled into one alphabetical arrangement in one catalog. In contrast, a divided catalog can be maintained where there is a separate catalog of the library's books arranged by subject, and another catalog arranged by author and title. Some libraries, such as UCSB, have still another catalog which is arranged by call number and is available to the public. This third catalog is called a Shelf List since it is in the same order that the books are arranced on the shelves.

The pages that follow this introduction contain explanations of the subject information included in a unit record. The complexities of classifying works and the complexities of alphabetizing are discussed.

Each unit record in the catalog is designed to include enough information not only to identify the work it represents, but also to aid in the retrieval of that work for use by a library user.

Many libraries prepare a printed book form of the periodicals, magazines, journals, and other serials held by the libraries. Such serials lists are updated on a regular basis. In some libraries this is done weekly (or even daily if the file is in computerized form), monthly, quarterly, or semi-annually. The value of a serials list is that duplicate copies can be made available at many reference points throughout the library. Certainly a great convenience! The entries are made according to title, or main entry, in an alphabetical arrangement. A Key Work Out of Context (KWOC) listing is also provided to take care of the situation when the user is not sure of the correct title or entry, but knows a word or two in it.

Time spent in understanding fully the arrangement and means of access provided by the catalogs of a library, is time well spent.

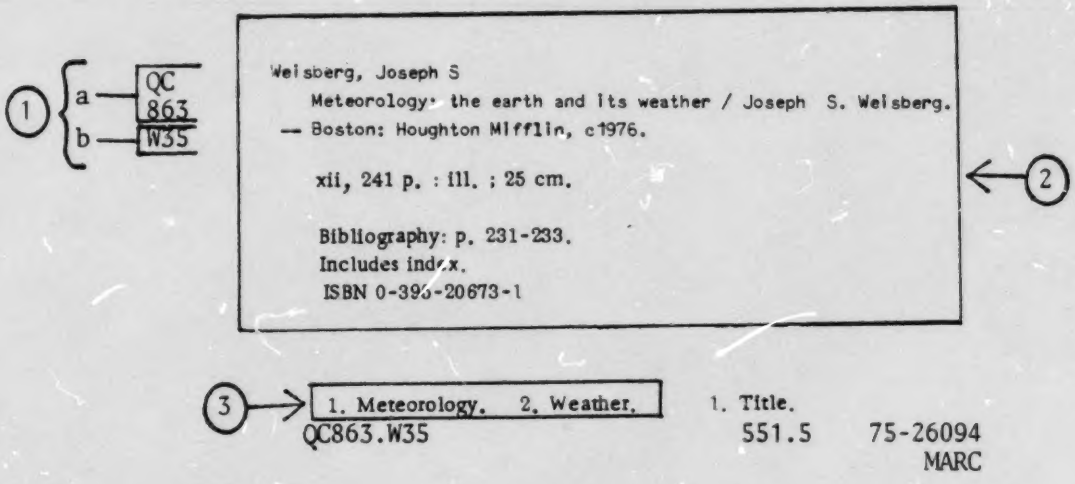
THE CATALOG CARD AND CARD CATALOGS

The Catalog Card

A set of catalog cards is produced for every separately cataloged publication owned by a library. Each card is usually a complete copy of a set of data elements, which, together, constitute an unique unit record of the publication. Each of these data elements in the unit record helps identify or characterize in some way a book, a journal, or some other physically and bibliographically independent work. (Individual articles within journals or symposia are not cataloged, since they are not both physically and bibliographically independent.)

The information provided by these data elements on the catalog card can be broadly classified into three kinds: a) locational information, indicating where a publication is normally shelved within the library; b) bibliographic information, including the author, title, publishing data, and physical or other descriptive characteristics; and, c) subject information, indicating the major subjects of the work as a whole.

A catalog card illustrating these three broad classes of information within the unit record is reproduced below.



(1) The call number assigned this publication
- a The classification code.
- b The cutter code.

(2) Bibliographic information identifying the publication.

(3) Subject information indicating the major topics of the publication as a whole.

A. Locational Information

The location of a separately cataloged publication on the library shelves is determined by the call number. Most academic, research libraries in the United States construct call numbers according to systematic codes of letters and numerals used at the Library of Congress. In the simplest case, this alphanumeric call number consists of two parts: a classification code and a Cutter code. Even though these codes consist of both letters and numerals, they are referred to traditionally in libraries as classification numbers and Cutter numbers. This terminology will be used in the following discussion.

The classification number is chosen basically to represent the core subject of the publication. For example, QC 863, in the sample card on page 1, is the classification number assigned certain textbooks in meteorology or climatology. Classification numbers can often be used for quickly browsing publications on a subject, since publications with a common classification are shelved adjacent to each other. The browsing convenience of classification numbers can be very helpful in researching a topic, as long as the researcher understands that the Library of Congress classification system is only one of many possible classification systems, and therefore represents a particular point of view about the organization of knowledge which the researcher may or may not share. It is also important to understand that any classification system dealing with all recorded knowledge is almost inevitably imperfect in many of its details, and that some concepts used may well be outdated. Library of Congress classification numbers assigned various subjects can be found in what are known as classification schedules. Summaries, as well as detailed schedules, are available at most reference desks in academic libraries.

The second part of the call number, the Cutter number, is derived in part from alphanumeric tables which encode the author or title of the publication. Unlike the classification number, which is read as a whole number unless a decimal point is specifically included, the Cutter number is always read as if a decimal point appeared immediately following the letter. Thus, W35 in the reproduced card above is read as W.35. As a result, QC 863 W296 would shelve before QC 863 W35. Understanding the Cutter number as a decimal is necessary in locating publications in large, research libraries where many volumes will be classified in the same subject, and are, therefore, sub-arranged by cutter numbers.

B. Bibliographic Information

The second kind of information within the unit record on the catalog card is bibliographic information. Among the data elements included are author(s), title(s), publisher, pagination and other descriptove characteristics. Examples of these data elements appear on the reproduced catalog card on page 1.

It is important to realize that the data elements classified as bibliographic information are produced using a complex set of internationally accepted cataloging rules. Thus, as an example, the author of a separately cataloged publication is generally defined as the person(s) or organization(s) having primary responsibility for the intellectual content of the work. This results in treatment of corporate bodies, such as the University of California or the American Geological Institute, as the authors of publication--a practice which frequently occurs in the cataloging of scientific books and serials.

The major benefit in the use of bibliographic cataloging rules is that they provide a reasonably predictable level of uniformity of data elements throughout American academic libraries. Learning which data elements are used and where they can be found in one library's catalog results in information that is applicable in the use of many other library catalogs.

The application of such rules by libraries can also result in unexpected user difficulty in determining the author or title of a number of scientific publications, particularly symposia and works published by governments or subgroups of scientific societies. In the latter cases, it is best not to conclude that a publication is unavailable in the library simply because a card cannot be found under its intuitively obvious author or title. Instead, consult a reference librarian, who may be able to suggest other locations in the catalog where the unit record can be found.

C. Subject Information

Data elements classified as subject information are usually limited to two or three subject terms chosen so that they characterize the overall topic of the publication or else the two or three major subjects covered. Thus, as shown in our sample catalog card, only the terms "meteorology" and "weather" are assigned, even though tornadoes and hurricanes are discussed in the publication itself and two chapters are devoted to climatology. No terms are assigned for these latter subjects because they are not the topic of the book as a whole. Due to this cataloging practice the catalog user should research a topic by consulting both the specific subject and broader subjects which include the specific subject.

The words used to express a subject in Library of Congress cataloging are carefully controlled and related. In practical terms, this means the catalog user risks wasting valuable time, unless he learns how the Library of Congress chooses to express a subject in which he is interested. In turn, this means understanding how to use the publication by the Library of Congress called Subject Headings. These large volumes (and their updating supplements) are usually located near card catalogs or at reference desks.

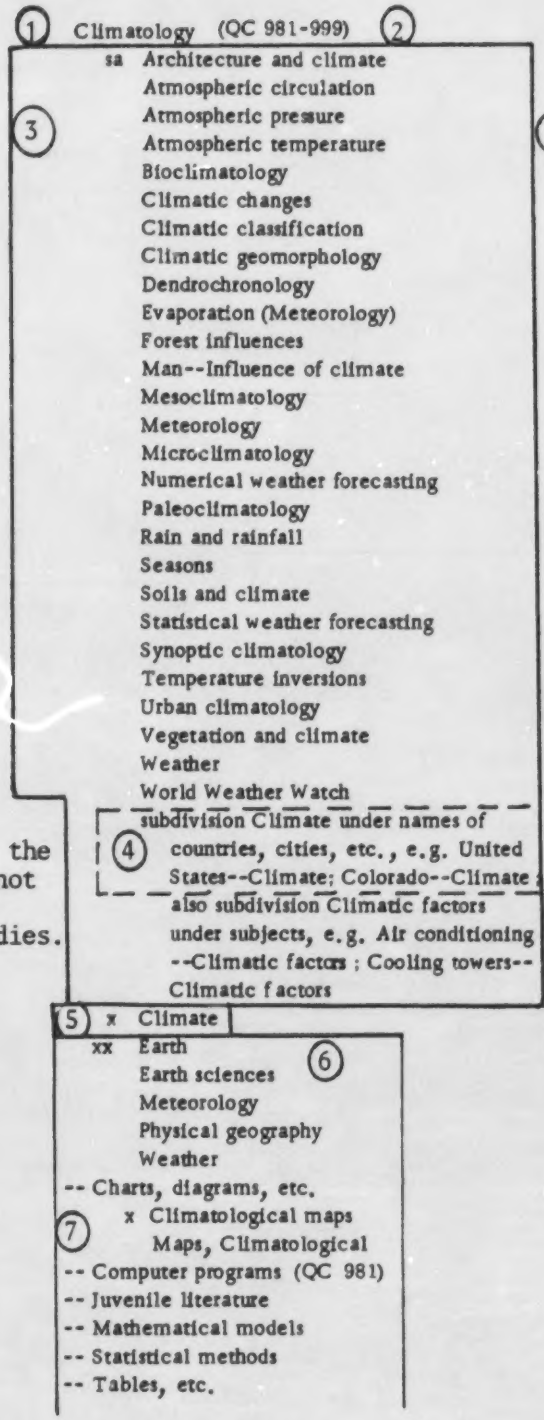
An example from Subject Headings, is shown on the following page. Annotations explain the symbols used by the Library of Congress.

From the example, it can be seen that the Library of Congress Subject Headings provides far more than simply a list of words which are accepted or rejected as subject terms. It provides a complex chain of related subject headings or subdivisions which richly supplement the original term. In many cases the related terms may be more nearly relevant to a research interest than the term originally chosen for subject searching. In addition, the Subject Headings often provides a classification number for browsing some of the publications on the subject expressed by the accepted term.

The Card Catalogs

The division of the unit record on the catalog card into three basic kinds of information often corresponds to the division of academic research library catalogs into three separate files. These are: a) the shelf list, arranged by call number order; b) the author-title catalog, arranged in modified alphabetical order by author(s) or title entry and, c) the subject catalog, again arranged in modified alphabetical order, by subject entry. Just as

(1) Bold-face print indicates that this term is used by the Library of Congress.



(2) The classification code following the subject indicates that publications having the central subject of climatology can be browsed directly on the shelf.

(3) "sa" is an abbreviation for "see also." It refers to accepted Library of Congress terms which are narrower than or related to "Climatology."

(4) This section of the see also list indicates that publications on climatology may additionally be found under the name of political units. However, the term, "Climatology" is changed to "Climate."

(5) "x" indicates that the word "climate" is not used for general climatological studies.

(6) "xx" indicates terms used for subjects broader than climatology or related to it.

(7) The symbol "____" indicates terms which are used for subdivisions of the term "Climatology", e.g. "Climatology__ Computer programs."

the three kinds of information on a catalog card provide different identifying characteristics for the same publication, so the three parts of a divided catalog serve different and complementary functions in locating needed publications owned by the library. These functions and some basic conventions needed to use these files are discussed below.

A. The Shelf List

The shelf list serves as the official record of the Library's separately cataloged publications. It includes information on the number of copies of each individually cataloged work held, a listing of volumes owned in multi-volume sets, certain serial holdings, etc. From the library researcher's point of view, its most important use is that it functions as a record of the titles held by the library in the exact order they would occur on library shelves, if nothing were checked out and every volume were in its proper place. Thus, it serves as a backup check on many library holdings, when direct browsing of library shelves has proved disappointing.

Since the shelf-list is filed by call number, it is important to recall that it will be sub-arranged within a classification number by the cutter number interpreted as a decimal.

B. The Author-title Catalog

The author and title are nearly always the most important data elements by which the library user identifies a publication bibliographically. For this reason a separate card catalog is often created which contains either a card for the author or a card for the title of each separately cataloged publication in the Library's collection. In most cases, a card is made for both author and title.

Unfortunately, the author-title catalog is a very complex tool to use. As discussed before, corporate bodies are considered authors of many publications. The method of naming them is controlled by complicated cataloging rules. For example, the author of Oil Pollution: an index-catalog to the collection of the Oil Spill Information Center is listed as: California. University, Santa Barbara. Library. Oil Spill Information Center. Since such an author is hardly that which would occur to the typical library researcher, most publications without a personal author are advisedly searched under title. However, even titles can be somewhat difficult to identify, particularly if they are non-distinctive, such as Directory, Handbook, etc. or in the case of scientific proceedings, symposia and colloquia. Reference librarians are available to help in such cases.

Almost as complex are the catalog filing rules. Card catalog users often fail to find the publication they need, because they do not realize that even the alphabetizing rule differs from that in ordinary use. Author or title cards are filed in alphabetical order, word by word, then within each word, letter by letter to the end of the word. This rule differs from conventional alphabetizing in dictionaries, telephone directories, etc.; the latter file letter by letter disregarding spaces between words, i.e., they file multiword entries as one word. The application of library alphabetizing rules in large catalogs can result in a significant displacement of an author or title from the location in which it is normally expected to occur. For this reason, it is important to understand these card catalog conventions.

Many other filing rules significantly modify normal alphabetical sequence. They are too numerous and complex to review here. As a practical rule, some filing conventions can be coped with by browsing somewhat ahead or behind the location in the catalog drawer where one expects to find the appropriate card. If this fails, consult a reference librarian.

C. The Subject Catalog

As explained in the section above on the catalog card, subject terms are controlled by the Library of Congress Subject Headings. Understanding the structure of these lists and the meaning of the sumbols used (as explained previously) will signigicantly increase the user's chances of finding relevant publications.

Filing rules once again modify alphabetical sequence. Word by word alphabetizing is applied as explained in the section on the author-title catalog. In addition, subdivided subjects or other modifications of a subject file as follows: 1) unmodified subject, 2) subdivided subject, 3) inverted subject, 4) modified subject. As a partial example, "Chemistry" files before "Chemistry--computer programs", which files before "Chemistry, analytic."

Many filing conventions in the subject catalog can be overcome by a little browsing. When this fails, use a reference librarian as your resource.

CARD CATALOG EXERCISE

The purpose of this exercise is to acquaint you with the three sections of the card catalog, and to provide practice in using some of their basic conventions to find needed publications.

1. a) Circle the number of the entry which would file first in the Author-title catalog:

   1)_____

   2)_____

   b) If these entries were filed alphabetically, letter by letter, would you find them in the same order?

   Yes _____ No _____

   c) Very briefly explain the reason for your answer:_____

   _____

2. You need to find out whether the Library has some publications in which the major subject is_____

   _____

   a) What is the most specific subject heading under which you found such publications listed?

   _____

   b) List one related subject heading from the Subject List where additional information on the subject might be found:

   _____

3. The Library of Congress Subject Headings indicates that publications concerned predominantly with the subject of whales can be browsed on the library shelves under the classification, QL 737 .C4, or, can be found listed in the subject catalog under the term "whales."

   a) If you found no publications on the shelves classified QL 737 .C4, would it be reasonable to conclude that the library owns nothing with this classification?

   Yes _____ No _____

b) If no, then name two places where you could systematically search to determine whether the library owns publications primarily on whales.

1)_____

2)_____

c) Which of the two places you listed is more likely to reveal more cataloged publications on whales?

1)_____

2) Check your answer by actually searching in both places you have listed above. Explain why the results you discovered are likely to occur whenever a browsing number is listed for a subject term.

_____

_____

4. Indicate the numerical sequence (1 through 5) in which you would find the following hypothetical call numbers in the shelf list or on the library shelf.

	TD 430.5 L76	TD 430 D43	TD 431 D175	TD 430 D5	TD 430 D272
Numerical Sequence	____	____	____	____	____

THE SERIALS LISTINGS

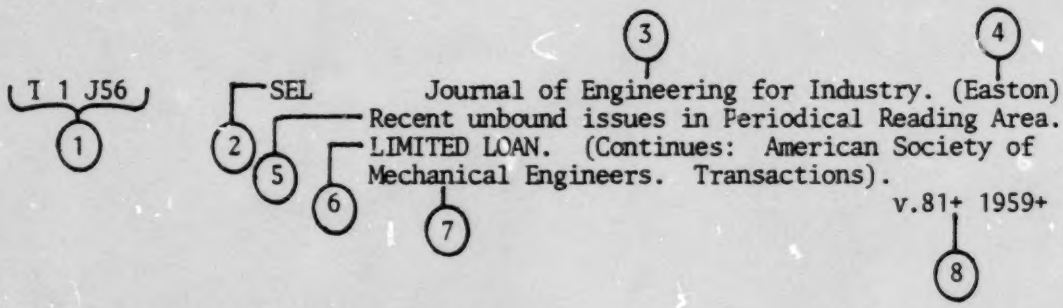
This is an exercise in the use of the Serials List. It is the primary tool for identifying and locating journals, magazines, periodicals, proceedings and other similar publications issued somewhat regularly that the library receives. There are two parts to the Serials List that will be of particular importance to you: the Alphabetical listing and the Key Word Out of Context (KWOC) listing.

Alphabetical Listing

The filing in this list is word by word, within each entry. Because the entries are filed by computer methods there are some differences from filing in the card catalog, particularly with title entries which are interfiled with the corporate author entries.

Another important point to remember is that the publications of associations, societies, institutes and other corporate bodies which begin with "Journal of", "Bulletin of", "Proceedings of", etc., followed by the name of the corporate body are filed under the corporate name. Thus, Journal of the American Medical Association will be found in the listing under American Medical Association. Journal.

The following is an entry found in the alphabetical list with explanations of the elements:



1. Call number.
2. Indicates journal housed in the Sciences-Engineering Library.
3. Title.
4. City where published.
5. Indicates that the current year and possible previous year's issues are housed separately from bound volumes.
6. Means publication may be borrowed overnight by students.
7. History note showing previous (and succeeding) name(s) of journal.
8. Volumes and issues held by the library. A plus (+) after the volume and/or year indicates the subscription is current.

For a fuller explanation of how to use the Alphabetical Serials List, consult the first and second pages ot that list.

KWOC Listing

This listing is particularly useful in identifying serial publications for which you do not have the full title, particularly the first word. The arrangement is by keywords (significant words) found in the title. Prepositions, articles and general words (example: journal) have not been used as keywords. However, general words are used as keywords is they are the first word of the title.

Each keyword is used as a heading above a block of titles, alphabetically arranged, in which the keyword occurs. Some information contained in the alphabetical listing has been omitted from this listing, such as, notes, and circulation information. However, information on the call number and the library's holdings is included.

For a fuller explanation on filing arrangement and on how to use the KWOC list, consult the first page of that list.

SERIALS LIST EXERCISE

The following exercises are to be answered by using the Alphabetical and/or KWOC listings:

1. From the following publications select one and answer the questions:

   -Journal of the American Chemical Society
   -Proceedings of the American Mathematical Society
   -Bulletin of the New York Academy of Medicine
   -Transactions of the American Society of Agricultural Engineers

   a. Title as listed in the Alphabetical Listing? _____

   _____

   b. Call Number? _____

   c. Library's holdings? _____

   d. How can you tell if the library currently subscribes to this title?

   _____

   _____

   e. Is it limited-loan or non-circulating? _____

   f. If limited-loan, what does this mean? _____

   _____

2. Look up the publication Physiological Entomology (it previously had other names) and answer the following:

   a. List the former names: _____

   _____

   _____

   _____

   b. Any change in call numbers? What are they for the current and older titles? _____

   _____

   _____

c. What are the library's holdings for the current title and the ones preceding it? _____

_____

d. Under what keyword in the KWOC listing would you expect to find all the variations of title? _____

e. Look under Entomological in the KWOC listing and identify the publication's full title in 1969. _____

_____

3. Look up the title Federation Proceedings.

a. How did you find it? _____

_____

b. What is the full entry? _____

_____

c. What is the call number? _____

4. Look up the title Comptes Rendus published by the Academie des Sciences in Paris, call number Q 1 A2.

a. Is it listed in the Alphabetical listing under Comptes Rendus? ____

b. What is the full entry? _____

_____

_____

PART II

INFORMATION CONTROL TOOLS

Introduction: Information Control Tools

The scientific journal - one of the most distinct and fundamental innovations of the Scientific Revolution - was invented in the middle of the seventeenth century. Less than one hundred years later, the number of science journals had grown to around three hundred. With this rapid growth, mounting problems in identifying and retrieving papers became evident and another innovation, brought about by the first, appeared on the scene. This invention was the abstract and index journal.

Over the years abstracting and indexing journals in the sciences have changed, but the basic philosophy and concepts have remained the same. The changes and improvements came about mostly in response to the continuing rapid growth of science and the information needs of the scientists using the abstracts and indexes. Although abstracts and indexing sources may be defined in a number of ways, basically they are continuing bibliographic services offered by various types of organizations and may contain abstracts and/or references to currently published literature including: periodical and journal articles; pamphlets; books; patents; technical reports; conferences and proceedings; theses and dissertations; and related materials. They may also be characterized as being mission or discipline oriented and being designed for current awareness or for retrospective searching or both.

Mission oriented services largely got their start after World War II in response to the information needs of newly formed organizations (mostly Federally sponsored) comprised of scientists from various disciplines working together on complex, interdisciplinary problems. Two examples of mission oriented abstracting and indexing services that owe their existence to the rapid growth of mission oriented sciences in the post-World War II era are Scientific and Technical Aerospace Reports and International Aerospace Abstracts. Both are Federally supported, receiving funds for publication from the National Aeornautics and Space Administration. It is interesting to note that the mission oriented services tend to be devoted largely to technology, a distinction that cannot be made for the discipline oriented services.

As indicated earlier, abstracts and indexes may be designed for current awareness or for retrospective searching, or designed to meet both needs. Current awareness sources are designed primarily to keep up with the current literature in a specific subject, field, or discipline and usually do not have cumulative indexes. Abstracts and indexes designed for retrospective searching usually contain a number of well constructed, cumulative indexes enabling the user to search and retrieve the literature of the past. In recent years some publishers of abstracts and indexes have attempted to redesign their services to accommodate both current awareness and retrospective searching needs. This has been done by arranging the entries - abstracts or titles of papers - topically or by subjects within each issue and providing cumulative indexes to them. As one would expect, this has met with varying degrees of success and a considerable amount of experimentation.

The first exercise in Part II is an introduction to the abstracts and indexes in the Sciences. In particular, it attempts to illustrate the differences and characteristics of a relatively simple indexing source and a very sophisticated and complex abstracting service. This exercise is also a precursor to those exercises that follow which examine and treat abstracts and indexes grouped in the following areas: Physical Sciences; Earth and Environmental Sciences; and Life Sciences. Grouping abstracts and indexes into such broad subject areas has advantages for it allows discussion of their common features and elements and permits comparison with others similarly related.

INTRODUCTION TO ABSTRACTS AND INDEXES

This exercise is designed to introduce you to indexes and abstracts in the sciences, and in particular to point out how important it is to understand the structure of the rather sophisticated subject indexes that you will need to use. Indexes in specialized subject fields which attempt to cover their fields comprehensively (such as Chemical Abstracts) are of necessity rather complex in comparison with Applied Science and Technology Index, which provides broad coverage of the journal literature in science and technology, but is limited to the indexing of a relatively small number of English language periodicals.

Applied Science and Technology Index is intended to help the user find some journal articles on a subject (preferably in easily available sources) and makes no claims to comprehensive coverage. The major subject specific services are intended for practitioners in specific fields and hence attempt much more comprehensive and detailed coverage of the documents in those fields.

For a comparison of Applied Science and Technology Index with Chemical Abstracts you are to search for documents dealing with aspirin. Because of the complexities of Chemical Abstracts, a brief (and necessarily incomplete) explanation of that publication follows.

Chemical Abstracts provides comprehensive coverage of the chemical literature from 1907 to the present. Through this period of time, there have been numerous changes in indexing policies. This exercise is based on the 9th collective period (1970-1976), and the conclusions which you reach will not necessarily be applicable to other periods of time.

There are twenty-six issues of Chemical Abstracts each six months, and at the end of each issue there are four indexes, including a Keyword index for which the vocabulary is not controlled, so that all synonyms for a given concept, material, etc. must be searched. These issue indexes are not cumulated.

The semi-annual indexes, on the other hand, are based on a vocabulary that is at least partially controlled. Two of these indexes are the General Subject Index and the Chemical Substance Index. The latter is used whenever you with to look up a specific chemical substance such as a specific chemical element, compound, alloy, etc. The entries in this index are based on rigid nomenclature rules, which are partially described in the Index Guide to the Ninth Collective Index. The Index Guide, which will be kept behind the SEL Reference desk during this quarter provides some guidance to the entries in both the Chemical Substance Index and the General Subject Index. Terms that are used in the indexes will not necessarily appear in the Index Guide, but there are many cross-references from terms that are not used to those that are.

In using the Chemical Substance Index, it is important to distinguish between the Registry Number, which is a number assigned by Chemical Abstracts Service to uniquely identify the substance (and which is always in square brackets) and the abstract number (several digits ending with a single letter) which you use to locate the citation and abstract for a given entry.

ABSTRACTS AND INDEXES EXERCISE

For the purposes of this exercise, you are to limit your search to the 1976 volume of Applied Science and Technology Index and to either Volume 84 or 85 (both from 1976) of Chemical Abstracts.

(1.) Find a document on aspirin using the 1976 Applied Science and Technology Index.

a. Under what subject heading did you find the document? _____

_____

b. In which journal does the article appear? _____

_____

c. What are the volume number, pages, and year? _____

_____

d. Does the UCSB Library subscribe to that journal? _____

(2.) Find a document on aspirin using either vol. 84 or 85 of Chemical Abstracts. (You should make use of the information about Chemical Abstracts that was given above.)

a. Did you find your reference in the Chemical Substance Index or the General Subject Index? _____

b. Under what subject heading and heading modification did you find the document? _____

c. What is the Chemical Abstracts volume and abstract number? _____

_____

d. What is the bibliographic citation* ? _____

_____

e. Does the UCSB Library own this document? _____

* Note: The bibliographic citation depends on the format of the publication. For a journal article, it is the journal title, volume, pages, and year. For a patent it is the country, patent number, and year. Ask a reference librarian, if you have any doubt about the meaning of "bibliographic citation" as applied to a particular kind of document.

(3.) Which of the two sources has more references on this subject? _____

_____

(4.) Briefly compare the methods you used to find the information in these two sources.

(5.) Speculate on the reasons the approaches of these two sources are so different.

(6.) Speculate on the consequences of using Chemical Abstracts without studying or understanding its structure and bibliographic control functions.

ABSTRACTS AND INDEXES IN THE PHYSICAL SCIENCES

Thousands of scientific articles are published each year in the professional journals. In addition there are technical reports, symposia, congresses and proceedings, scientific books, dissertations and patents that add to the output, an output that is so prodigious that keeping up with the scientific literature in one's field requires much effort. This fact has led to the creation of a large number of abstracting and indexing services that provide information on what is published, both current and archival.

Basically, abstracting and indexing services provide references in an organized manner to help users identify the documents they need. An indexing service or source usually limits itself to such information as author, title, volume, page number and date which are needed to retrieve the document. An abstracting service may in addition contain summaries of the contents of the documents. Abstracts provide additional information in order that the user can determine a document's relevancy, information that is not always easily determined from the title alone. When looking for an abstracting or indexing service to do a search, do not be misled by the name for there is some confusion in naming these services. For instance, Engineering Index, INIS Atomindex and several other services also contain abstracts.

Abstracting and indexing services may be designed for current awareness or for retrospective searching, or for both. Those designed for retrospective searching usually contain a number of well constructed, cumulative indexes enabling rapid searches to be made over a long period of time. Physics Abstracts and Government Reports Announcements and Index are typical examples. Current awareness sources usually do not have cumulative indexes and are designed for keeping abreast of the current literature in a subject or field. Its value depends on the speed with which it follows and announces the original publications. Typical examples are: Current Contents and Current Mathematical Publications.

The following is a list of selected abstracts and indexes in: General Science, Mathematics, Computer and Information Science, Physics and Engineering. Only the major ones are listed although there are numerous others in each category which treat a more limited and narrow segment of the field.

General

1. Applied Science and Technology Index
2. Current Contents (several separate sections)
3. Dissertation Abstracts International (Section B, The Sciences & Engineering)
4. Government Reports Announcements and Index
5. Science Citation Index
6. Selected Rand Abstracts

Mathematics

1. Bulletin Signaletique 110, Informatique Automatique
2. Current Mathematical Publications
3. Mathematical Reviews
4. Referativny Zhurnal, Mathematika
5. Zentralblatt fur Mathematik und Ihre Grenzgebiete

Computer & Information Science

1. Computer Abstracts
2. Computer and Control Abstracts
3. Computing Review
4. Information Science Abstracts

Physics

1. Current Physics Index
2. Meteorological and Geoastrophysical Abstracts
3. INIS Atomindex
4. Nuclear Science Abstracts
5. Physics Abstracts
6. Astronomy and Astrophysical Abstracts

Engineering

1. Applied Mechanics Review
2. Electrical and Electronics Abstracts
3. Engineering Index
4. International Aerospace Abstracts
5. Scientific and Technical Aerospace Reports

ABSTRACTS AND INDEXES IN THE PHYSICAL SCIENCES EXERCISE

In the following exercise you will be examining and using several publications on the abstracts and index list. To find out where they are shelved, consult the Serials List at the Sciences-Engineering Library (SEL) reference desk to get the call numbers. Most will be shelved in call number sequence in the special location abstract and index area near the SEL desk. If you have any problem in locating them, ask at the desk for assistance.

I. Select one abstract or index from each of the categories and answer the following questions. These are the basic questions you should ask yourself when using an abstract or index in doing a literature search.

a. What is the issuing frequency? (Monthly, quarterly, etc.)

b. Approximately how long has the publication been in existence? (This is important to know if you are going to do a retrospective search going back in time a number of years.)

c. What kinds of materials are included? (Journals, books, conferences, theses, etc.)

d. Does it include world-wide coverage of the literature or is it restricted geographically?

e. What indexes does it contain? List them.

f. In your opinion, is the abstract or index easy to use? Any special problems?

g. Does it contain any special features that you consider particularly useful?

II. In this part pick two publications from the list (pick two that contain abstracts) and select an abstract from each. Then retrieve the full articles from the collection and compare them against the abstracts.

a. Do you think the abstracts are good summaries of the contents of the papers? Comments?

b. If no abstract was available, could you have determined the relevancy of the article from the title alone? Comments?

I

General: Title _____

Call number _____

a. _____ b. _____

c. _____

d. _____

e. _____

_____

f. _____

_____

g. _____

_____

Mathematics: Title _____

Call number _____

a. _____ b. _____

c. _____

d. _____

e. _____

_____

f. _____

_____

g. _____

_____

Computer Science: Title _____

Call number _____

a. _____ b. _____

c. _____

d. _____

e. _____

_____

f. _____

_____

g. _____

_____

Physics: Title _____

Call number _____

a. _____ b. _____

c. _____

d. _____

e. _____

_____

f. _____

_____

g. _____

_____

Engineering: Title _____

Call number _____

a. _____ b. _____

c. _____

d. _____

e. _____

_____

f. _____

_____

g. _____

_____

II

Title/Vol./Year _____

Article/Pages _____

a. _____

_____

_____

b. _____

_____

_____

Title/Vol./Year _____

Article/Pages _____

a. _____

_____

_____

b. _____

_____

_____

ABSTRACTS AND INDEXES IN
THE EARTH AND ENVIRONMENTAL SCIENCES

Introduction

The earth sciences can be defined to include the disciplines of geology, hydrology, oceanography, meteorology/climatology, and those fields of geography concerned with the spatial analysis of phenomena existing on the earth's surface, and in its atmosphere. The environmental sciences can be defined as that part of environmental studies which applies the physical and biological sciences to the understanding of environmental processes and problems. Typically, the environmental sciences are concerned with conservation, ecology, pollution, energy, food production and population dynamics.

The definitions just given suggest what in fact is true; namely: that the earth and environmental sciences use or contribute to nearly every major aspect of the sciences and technologies. This observation in turn suggests that nearly every abstract or index published to access the vast information produced in the sciences or technologies is potentially relevant to some aspect of the earth and environmental sciences. However, a title by title review of the hundreds of abstracts or indexes available in the sciences and technologies is neither possible nor desirable in a survey course such as this. Nor, except under very special circumstances, is it ever important to know and continuously update this complex field of the information control tools in the sciences and technologies. That which is of practical importance for the student in these disciplines is: a) the development of a method to select a set of abstracts or indexes relevant to a given information need, and b) the development of the skills necessary to evaluate the comparative effectiveness of such tools in providing needed unit records of the literature. For these reasons, the subject of this laboratory session is the basics of such methods and skills as they apply to the earth and environmental sciences.

To develop the appropriate methods and skills, we first need some additional insights into the characteristics of the earth and environmental sciences. We will then use these characteristics to describe five general types of abstracts and indexes relevant to the sciences under consideration. We will conclude with a discussion of some practical guidelines in selecting and evaluating useful abstracts for specific search queries in these sciences.

Some Characteristics of the Earth and Environmental Sciences

The first and fundamental characteristic of these sciences is that they are both multi-disciplinary and interdisciplinary. They use the many concepts, techniques, research results and applications of all the traditional sciences. This multi-disciplinary information is then related and focused on interdisciplinary subjects. The word, "interdisciplinary", is not used simply to mean a mixture of the research of the several sciences. It means the relating of the traditional sciences to research subjects which

are unique to the earth and environmental sciences. To illustrate this point, let us consider the research subject, paleontology. Paleontology uses the theory of evolution, the classification or study of vertebrate and invertebrate phyla, and, the classification or study of unicellular or multi-cellular plants -- all associated with the biological sciences. In turn, paleontology needs the theory and techniques of physics to predict, to date, and to explain the conditions, and the forces necessary for the preservation of fossils and their altered remains. Furthermore, paleontology requires a knowledge of chemistry to understand or predict the occurrance of compounds resulting from ancient fossils. Yet the science of paleontology remains almost exclusively a part of the geological sciences, not as a mixture of the contributing sciences, but as an independent subject itself.

A second characteristic of the earth and environmental sciences is that they are all applied sciences. They use the traditional sciences and apply them in research designed to provide the goods and services needed by the individual and society. Basically, the goods and services provided by the earth and environmental sciences deal with the location, inventorying, dynamic relationships and management of natural resources for the benefit of man. The emphasis on the practical is similar to other applied sciences such as medicine, engineering and agriculture. Since the earth and environmental sciences are multi-disciplinary, they use the contributions of other applied sciences in the study of inter-disciplinary topics.

A third characteristic of the earth and environmental sciences is that their research is often program oriented. A program may be considered as a specified set of objectives arranged in a planned sequence, so designed that a goal is reached according to a time table. Examples of program oriented research in the earth and environmental sciences are easy to find. Consider oil exploration in the United States outer continental shelf for the geological sciences; legally required completion of land use plans in geography; and, environmental impact statements involving the environmental sciences.

A fourth characteristic of the earth and environmental sciences is their production and use of graphed data. Examples are topographic and thematic mapping, as well as the familiar aerial photograph and the newer imagery exploiting many other portions of the electromagnetic spectrum. Traditionally, most pure and applied sciences rely heavily on the printed text publications, or their mocroform equivalents, for communication of research results. Just as traditionally, the earth and environmental sciences have placed an almost equal emphasis on graphed data to communicate research results. It is important to understand that such data are not used by these sciences simply to illustrate or supplement textual information. Instead the publication of maps or manipulated imagery is often used as the major communication vehicle itself for which the textual information is simply supplemental.

Types of Abstracts and Indexes Used by the Earth and Environmental Sciences

The characteristics of the earth and environmental sciences just considered suggest that the number of potentially relevant primary science publications is very large indeed. Since it is not cost effective for a single indexing or abstracting service to monitor such a large number of diverse publications even for one major discipline, the result is that a researcher in the fields under review must consider the use of a variety of abstracts and indexes in order to gain access to the research publications needed for consultation. But which of the hundreds of abstracts or indexes are relevant and most useful for a given information need? A part of the answer to this question can be found through the division of published abstracts and indexes into five types, relative to the earth and environmental sciences. If an information need can be related to one of these five types, then the researcher can seriously consider elimination of abstracts and indexes classified in the remaining four types.

1. Core-definition abstracts or indexes are, by empirical generalization, the best known and most frequently used publications for researching the literatures of the earth and environmental sciences. Although some of their use results from mere habit or ignorance of effective alternatives, their reputation for in-depth coverage of core-definition subjects within a discipline provides the chief explanation for their popularity. By "core-definition", we mean those interdisciplinary subjects which are the central focus of a discipline. For example, the core-definition of geology can be understood as the study of the composition, structure and dynamics of the earth as it has evolved over some 4.6 billion years and its continued evolution. Its inter-disciplinary subjects will therefore include such subjects as paleontology (as discussed above), stratigraphy, structural geology, petrology and mineralogy.

Core definition abstracts or indexes monitor nearly exhaustively the journals which frequently publish or exclusively publish information on the interdisciplinary subjects belonging to the central focus of the discipline. Once outside this central focus, coverage of related subjects and the publications on such subjects becomes irregular and thus highly unpredictable. Examples of core definition abstracts and indexes are: the Bibliography and Index of Geology for the Geological Sciences, Geo Abstracts for geography, and Environment Abstracts for the environmental sciences.

The core definition abstract or index should be chosen when a) the information need of the researcher is close to or identical with the central focus of the discipline, and b) the researcher is willing to be limited to unit records citing publications frequently or exclusively producing information on the subjects of the central focus. Otherwise, he or she must turn to at least one of four other types of abstracts or indexes. These are:

2. The broad coverage abstracts or indexes published for one of the pure or applied sciences. Examples are Chemical Abstracts, Biological Abstracts, Engineering Index and the Bibliography of Agriculture. The large number of journals monitored by these publications assure in-depth

coverage of the classical subjects belonging to these disciplines. Included are a variety of applied subjects closely related to the earth and environmental sciences, and irregular coverage of their core-definition publications discussed above. The choice of which broad subject abstract or index to consult depends on which non-core subject component of the information query one wishes to emphasize, and, how well the subject is expressed in the indexing.

3. Another route which may be chosen for research of the non-core environmental or earth science topic is the specialized field abstract or index. Although narrow in focus, such publications often cover the literature of the specialized field nearly comprehensively. Examples of such abstracts are Soils and Fertilizers Abstracts, Oceanic Abstracts and Selected Water Resources Abstracts. The choice between broad coverage abstracts or indexes and specialized field abstracts or indexes is frequently based on the indexing vocabulary or else the advantage of consulting one field publication in place of using multiple, broad subject publications. With respect to the topics of earth and environmental sciences, field abstracts are often in a better position to use the technical or specific terms of a specialty as controlled vocabulary than those abstracts or indexes monitoring the publications of an entire classical science.

4. A significant choice for non-core subject searching is the program oriented abstract or index. Such publications monitor the literature on nationally or internationally defined problems in which large investments of capital and labor are committed to produce relatively rapid, multi-disciplinary solutions. One example of these publications is EIS covering environmental impact statements on proposed projects at the federal level. Another example is the Quarterly Literature Review of Remote Sensing of Natural Resources. Such publications are usually established to reduce the scatter of unit records among numerous abstracts or indexes, thereby providing a central source for literature searching.

5. A final choice is the graphed data index or abstract. An example is the Index to Geologic Maps of California (California Division of Mines and Geology. Special Report, No. 52, 52A, 52B, and 102). Some would prefer to label such publications as data collections, but, if you will recall that the earth and environmental sciences report their research through graphed data, it is apparent that a strong case can be made to consider publications monitoring this form of literature as indexes or abstracts.

A Basic Decision Procedure for Selecting and Evaluating Abstracts or Indexes in the Earth and Environmental Sciences

The selection of abstracts and indexes for literature searching and their evaluation share a number of features with the construction of a search strategy for computer searching. Both must begin with the careful analysis of a particular information need. Both continue with the development of facets which, through logical relationships express the meaning of the search. Finally, both procedures develop and mature through feedback procedures which correct and refine the search strategy and terms during the course of the search. Where they differ, of course, is in the complexity and sophistication of the mind as the search instrument, on one hand, and, the mechanical rapidity and simplicity of the inexhaustible computer on the other.

Once the meaning of the information need has been explicitly expressed, the choice of abstracts or indexes for examination must be made. As you will recall, the number of abstracts or indexes from which to choose is very large.

The first step, therefore, is to use the meaning of the search to concentrate on a manageable number of abstracts or indexes, thereby eliminating the large remainder from consideration. This begins by classifying the search topic as essentially belonging to one of the major disciplines or fields of the earth and environmental sciences. Aids for accomplishing this, are the treatments of the topic in general or specialized encyclopedias, dictionaries, textbooks, and, with due caution, by studying the relationship of the topic in the Library of Congress Subject Headings and classification schedules.

When the discipline or field to which the topic belongs has been determined, the information need requires classification in terms of the five kinds of abstracts and indexes discussed in the proceeding section. The questions to be answered include the following. Is the topic a central subject of an earth or environmental science discipline? If not, is it more closely related to a field of one of the classic scientific disciplines, or is it so broadly interdisciplinary that specialized field abstracts or indexes are required? Perhaps the topic can be classified as requiring a program oriented abstract or index, or is it one in which research results are frequently reported as graphed data?

Once such questions have been answered, the abstracts or indexes which most closely match such requirements must be selected for evaluation from lists of those available. Such lists can be located using several tools. They can be found using: a) the appropriate subject headings of the library catalog as subdivided by the term "Abstracts" or "Indexes", or, b) by consulting guides to the reference sources for disciplines or fields, or, c) by working with reference librarians. In general, all three sources should be used.

When abstracts or indexes have been matched as closely as possible to the two sets of requirements just discussed, they must then be examined and comparatively evaluated for effective control over unit records matching the information need. Their content, and degree of comprehensiveness or selectivity can usually be determined by a careful review of their introductions, forewords, tables of contents and available thesauri. The critical empirical test, of course, is their use of subject indexing and the number of relevant unit records to which this indexing leads. At least two years of cumulative indexing and two or three current issues should be examined as a basis for any reasonable conclusion. Among the questions to be answered are: Is the indexing too narrow or broad? Are the indexing terms obsolete or used inconsistently? What is their comparative yield of relevant unit records?

As a result of this procedure, the most efficient control of the literature matching an information need can be determined, and the once formidable number of abstracts or indexes relevant to the earth and environmental sciences can be reduced to a level with which the average researcher can cope efficiently.

ABSTRACTS AND INDEXES IN THE EARTH AND ENVIRONMENTAL SCIENCES EXERCISE

The purpose of these exercises is to introduce some basic techniques used in evaluating and ranking abstracts or indexes as appropriate information control tools to answer specific information needs. Although these techniques are used in all fields of science information control, their use in the earth and environmental sciences fields is critical, since nearly every scientific abstract or index published can supply some citations relevant to an aspect of these fields.

In working through these exercises, you are not expected to memorize the titles or characteristics of the abstracts or indexes selected. You are expected to use such factual information to reason towards defensible conclusions.

General Directions

1. Carefully read and compare the two paragraphs in Part I, below. They describe the (hypothetical) information needs of an environmental studies student and a scientist working for a research and development firm.
2. Scan the list of abstracts and indexes in Part II. They have been selected as possible sources for answering the information needs expressed in Part I. Note that subject headings are suggested for later use in these exercises.
3. Read over all of the questions in Part III. Keep them in mind in relation to the information you will review in the abstracts and indexes.
4. Find the shelved abstracts or indexes listed, using the call numbers and location information in Part II. Examine: a) two years of the most recent, annual, cumulative indexes, and, b) three, unbound issues published during the current year. Use their introductions, forewords, tables of contents, titles, and the subject or title information listed under the suggested subject headings as the factual basis for answering the questions in Part III.

Part I

Information Need Statement A.

An environmental studies student is interested in current information on the environmental effects of stripmining for coal. He wants a good selection of up-to-date publications on the subject. He prefers citations to important, core journals--not obscure serials to which many academic libraries do not subscribe. He is particularly interested in publications which evaluate or describe efforts to restore the land to conditions approximating those existing before stripmining began. He plans to write an upper-division, undergraduate term paper, based on the information found.

Information Need Statement B.

A member of a research and development firm is interested in scholarly information on the environmental effects of stripmining for coal. His company has received a contract from the United States government to propose a series of experiments on methods of restoring approximate, pre-existing land contours (i.e., rise and fall of land) of stripmined areas in the western conterminous United States (i.e., from the Rocky Mountain states to the Pacific Coast states). Since the experiments will be subject to cost-effectiveness analysis, he is particularly interested in methods of preventing erosion by water after restoration. He realizes that grasses and other vegetation will be an important factor in reducing erosion. He needs a comprehensive search of the scientific and technical literature on these subjects, but has only a limited amount of time. Therefore, he wants to use abstracts and indexes which will readily provide a high yield of citations to relevant, recently published information.

Part II

List of Abstracts and Indexes to be Consulted

Abstract/ Index No.	Title	Call No.	Suggested Subject Heading(s)
1.	Bibliography and Index of Geology.	Ref Z 6031 G34	Land use - mines. Reclamation. Or Environmental Geology, Land Use Stripmining* (*note: subject headings are hierarchical; first find "Environmental Geology, Land Use," then, under this subject, find "stripmining.")
2.	Bibliography of Agriculture	Ref Z 5073 U5	Mining; strip
3.	Environment Abstracts Environment Index	Ref Z 7171 E59	Stripmining; Stripmining, Coal
4.	Selected Water Resources Abstracts	Ref TD 1 S4647	Strip Mines; Stripmining

Part III Directions: As you examine the abstracts or indexes listed in Part II, answer the questions below.

A. Is there information available on the subject coverage of the abstract or index, so that you can reasonably infer that citations on stripmining would be found in the

publication? If your answer is "yes", indicate the source of the information, i.e., title of abstract or index, introduction, foreword, table of contents.

Abstract/Index No.				
	1.	Yes_____	No_____	Source:_____
	2.	Yes_____	No_____	Source:_____
	3.	Yes_____	No_____	Source:_____
	4.	Yes_____	No_____	Source:_____

B. Is there information available on the forms of publications abstracted or indexed so that you can conclude whether or not the abstract or index includes unit records for all of the following forms of publications: technical reports, serials and books? If your answer is "yes", indicate the source of information.

Abstract/Index No.				
	1.	Yes_____	No_____	Source:_____
	2.	Yes_____	No_____	Source:_____
	3.	Yes_____	No_____	Source:_____
	4.	Yes_____	No_____	Source:_____

C. Do the abstracts or indexes make an explicit claim on the extent of coverage of relevant publications so that you can conclude whether or not there is coverage of most core serial publications for the subject specified by the environmental studies student? If your answer is "yes", indicate the source of information.

Abstract/Index No.				
	1.	Yes_____	No_____	Source:_____
	2.	Yes_____	No_____	Source:_____
	3.	Yes_____	No_____	Source:_____
	4.	Yes_____	No_____	Source:_____

D. Rank in numerical order, beginning with 1, the predicted usefulness of the abstracts and indexes in supplying the information needed by the environmental studies student and the R & D scientist. You may rank abstracts and indexes as equally useful, if you believe it is appropriate.

Environmental Studies Student			R & D Scientist	
Abstract/ Index No.	1. _____		Abstract/ Index No.	1. _____
	2. _____			2. _____
	3. _____			3. _____
	4. _____			4. _____

E. Explain briefly your reasoning for choosing the highest and lowest ranked index(es) and abstract(s) for the Environmental Studies Student.

1. Reasoning for the highest ranked: _____

2. Reasoning for the lowest ranked: _____

F. Explain briefly your reasoning for choosing the highest and lowest ranked index(es) and abstract(s) for the R & D scientist.

1. Reasoning for the highest ranked: _____

_____

_____

_____

2. Reasoning for the lowest ranked: _____

_____

_____

_____

_____

G. Would you advise the Environmental Studies student to use the computer searchable data bases corresponding to the printed abstracts and indexes you have examined? (Assume the student can finance the searches, but must make the usual priority decisions on allocating his funds for a computer search or other important goods and services. Also assume he has the time available for a manual search, but must make the usual priority decisions on allocating it to the search or to other important work.)

Yes_____ No_____

Reasoning:_____

_____

_____

_____

_____

_____

_____

ABSTRACTING AND INDEXING SERVICES IN THE LIFE SCIENCES

Organization of Subject Matter

The biological sciences, often referred to as the life sciences, is that group of sciences concerned with the study of living matter, its structure, development, growth, distribution, etc.

Division of the field may follow two fundamental principles:

1. Division according to the type of organism studied into the major disciplines, e.g.:
   a) Botany: the study of plants
   b) Zoology: the study of animals
   These divisions in turn may be subdivided according to species, e.g.: entomology (insects), bryology (mosses), ornithology (birds), mammals, reptiles and amphibians, pisces (fishes).

2. Division according to aspects that are common to all types of organisms into such disciplines as:

Morphology	Pathology
Taxonomy	Genetics
Anatomy	Embryology
Cytology	Ecology
Histology	
Physiology	Combinations such as: Neuro-endocrinology,
Biochemistry	Psycho-neuro-endocrinology, Psycho-
Biophysics	pharmaco-neuro-endocrinology

Another large group within life sciences are those grouped to form the health sciences, which are concerned with the prevention, cure, and alleviation of disease in humans. This group of sciences may be categorized as follows:

1. Basic medical sciences, such as pharmacology, anatomy, physiology, biochemistry, microbiology, pathology.

2. Clinical medical sciences, such as neurology, internal medicine, surgery, dermatology, obstetrics, pediatrics, uroloty, etc.

(There may be blends between the two above categories, for example, neuropharmacology.)

3. Allied medical sciences, such as dentistry, pharmacy, nursing, etc.

Still another large group within life sciences are the agricultural sciences which deal with the practices, arts, sciences, and industries utilized by man to obtain food from the land. The major subdivisions are agricultural economics, agricultural engineering, agronomy, animal science, dairy science, food technology, forestry, silviculture, horticulture, veterinary medicine, and home economics (sometimes termed human ecology) which covers nutrition, textiles, housing, and management of resources for human living in their physical, economic, and social aspects.

A counterpoint to agriculture is mariculture or aquaculture.

At UCSB the Biological Sciences Department has grouped the life sciences into eight undergraduate subject majors as follows: aquatic biology, biochemistry-molecular biology, biological sciences, botany, environmental biology, pharmacology, physiology and cell biology, and zoology.

Life sciences are arranged in broad categories in the Library of Congress System of Classification. In summarized form, it is as follows:

QH -- Natural History
includes Nature Conservation. Landscape Protection
Microscopy
General Biology
Genetics
Reproduction
Life
Ecology
Cytology

QK -- Botany
Plant Anatomy
Plant Physiology
Plant Ecology

QL -- Zoology
Animal Behavior and Psychology
Anatomy
Embryology

QM -- Human Anatomy
Human Embryology

QP -- Physiology
Neurophysiology. Neuropsychology
Animal Biochemistry
Experimental Pharmacology

QR -- Microbiology
Bacteria
Immunology
Virology

R -- Medicine

S -- Agriculture
Plant - Animal Culture

SH -- Aquaculture

TX -- Home Economics
Nutrition

Since life sciences are categorized in many ways, as seen by the examples in the above discussion, bibliographies, indexes, and abstracts in the field will have the information variously organized.

PRINTED FORMS and Corresponding Computer Files
for 4 Life Science Reference Services

Printed Reference Publications	Magnetic Tape Services
1/ BIOSIS: Biological Abstracts (BA). Published twice a month. Began publication in 1926. BioResearch Index (BioI) Published monthly. Title 1965-1966: BioResearch Titles. Title from 1967: BioResearch Index.	BIOSIS Previews (1969-current) Citations and index terms from both BA and BioI. Updated 36 times/yr. Tapes available about 5 weeks before printed version.
2/ EXCERPTA MEDICA (EM). Publishes 42 abstract journals and 2 drug literature bibliographies, each monthly. EM began publication in 1946/47 with 15 sections.	Excerpta Medica database (EMBASE). Back files from 1974 onwards are available. On-line accessibility on world-wide basis from 1978.
3/ National Library of Medicine (NLM): Index Medicus (IM) Published monthly with annual cumulations. New series began publication in Jan. 1960. IM has its roots in John Shaw Billings' work: Index-Catalogue of the Library of the Surgeon-General's Office. Series 1 began 1880.	MEDLINE (MEDLARS* on-line) (1966-current) Consists of citations to articles from the 3,000 journals indexed for Index Medicus, Index to Dental Literature, and International Nursing Index. Updated monthly. Information available online about 4 weeks before printed version. *MEDLARS is the NLM's acronym for its computerized Medical Literature Analysis and Retrieval System.
4/ Zoological Record. Prepared by the staff of the zoological Society of London since 1864. Published annually in 20 separate sections.	Zoological Record computer production began in 1973 with vol. 107 (1970). Database is not yet publicly searchable online.

ABSTRACTING AND INDEXING SERVICES IN THE LIFE SCIENCES EXERCISE

These exercises and reading assignments are to aid you in understanding the organization and methods of use of the following four bibliographic access sources:

A. BIOSIS services:
   Biological Abstracts. (abstracts)
   BioResearch Index. (index)

B. Excerpta Medica. (abstracts)

C. Index Medicus. (index)

D. Zoological Record. (index)

Assignments:

I. Read the next three pages, "How to Use Excerpta Medica Abstract Journals". As time permits, browse through the various sections of Excerpta Medica which are classified under R 1 E93 ...

II. Read the "Introduction" in a recent monthly issue of Index Medicus (Ref Z 6660 I52); and the "MeSH Introduction" in the current Medical Subject Headings. (Ref Z 695.1 M48 U5).

III. Look at Volumes 106, 107, and most recent volume of Zoological Record (Ref Z 7991 Z66).
   A. Observe the indexes--their format and method for use.
   B. Read, in the most recent volume, the pages of Introduction to the various sections. (Essentially it is the same Introduction repeated in each section).
   C. For contrast, and to see how a bibliographic service grows over the years, browse through the first volume (published in 1864) and read its Introduction.

   D. Optional Readings:

      1. "Universal index to zoological literature proposed." (Letters) BioScience 26 (9): 528-529, Sept. 1976.

      2. Bridson, G. D. R. The Zoological Record - a centenary appraised. Journal of the Society of the Bibliography of Natural History 5 (1): 23-34, 1968.

HOW TO USE EXCERPTA MEDICA ABSTRACT JOURNALS:

FIRST

Choose the section or sections most appropriate for your search.

Consult the list of sections in this leaflet, or, if necessary, the GUIDE TO THE EXCERPTA MEDICA CLASSIFICATION SYSTEM, in which the scope of coverage of each section is described in relation to the other sections.

THEN

For general queries or browsing

Consult the Table of Contents on the inside front cover (or the cumulative table of contents in the last issue of each volume), showing the classification system used in the section and the page number on which the first abstract in each category appears. An example is given on page 3. Note: abstracts are published once only per section, in the most relevant classification (sub)category, and are not repeated or cross-referenced under secondary classifications.

For specific queries

The Subject Index at the back of each issue (cumulated at the end of each volume) lists in alphabetical order the key words assigned to the articles by Excerpta Medica's medical specialists. Each entry term is followed by the other index terms assigned to the article, in alphabetical order, by free text (if appropriate), describing the specific article in more detail and then by the number of the citation and abstract in the body of the booklet. The string of key words, together with the secondary text, results in a "mini-abstract" reflecting the contents of the original document and facilitating a decision as to the possible relevance of the full abstract. Furthermore, the index terms are assigned to an article in relation to the overall subject matter of the section so that, for example, an entry under "testosterone" in the CANCER section of Excerpta Medica necessarily implies a relationship to cancer.

For example, one of the six rotating subject-index entries for the citation on tracheal intubation in the treatment of laryngitis shown on page 3 of this leaflet was:
endotracheal intubation, laryngitis, subglottic stenosis, trachea injury, trachea stenosis, tracheostomy, laryngitis treatment, tracheostomy vs. prolonged endotracheal intubation, stenosis as complication, age factors, 5 infants.

(terms resulting in an entry in the Subject Index are in italics)

The index terms are controlled by a computer-authority file called MALIMET. This file contains approximately 175,000 preferred terms and 275,000 synonyms (such as "trachea intubation" for "endotracheal intubation"). MALIMET represents a reference work of some 20,000 pages which is accessed only by computer terminal.

For drug queries

Drug synthesis, drug analysis and the effects and side effects of drugs, irrespective of the disease or part of the body involved, are dealt with in DRUG LITERATURE INDEX and ADVERSE REACTION TITLES, respectively. Special brochures on these bibliographies are available upon request.

For author queries

Use the Author Index at the back of each issue (also cumulated at the end of each volume). Here, the author's name is preceded by the number of the appropriate abstract/citation and is repeated if more than one article by a particular author is included. Note that surname prefixes such as "de la", "du", "van der" or "von" are not subordinated, so that such names appear alphabetically under the first letter of the prefix. Up to four authors are included in the index for each article; if there are more than four, the first three are entered, followed by the citation by the indication "et al".

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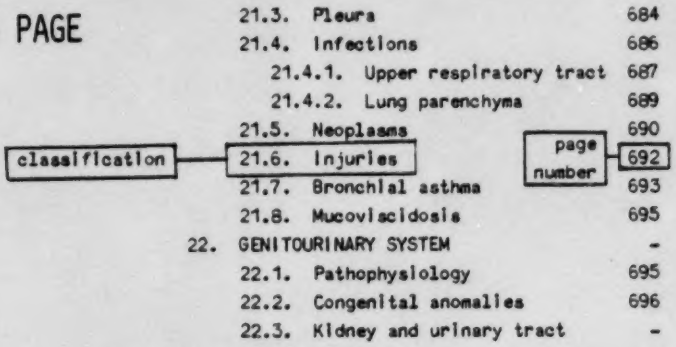
770 issues published per year
3,500 journals screened
10,000 pages screened daily
1,600,000 bibliographic references stored
250,000 references added yearly

For further information, consult the reference staff, or write to:

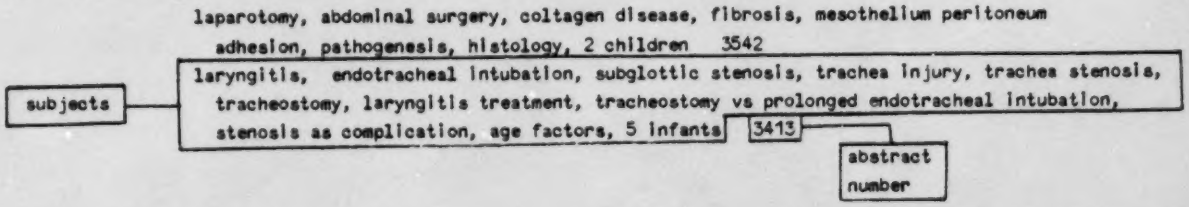
Journals Department
EXCERPTA MEDICA
P.O. Box 3085
Princeton, NJ 08540
(609) 896-9450

For a complete listing of the sections, please see back cover.

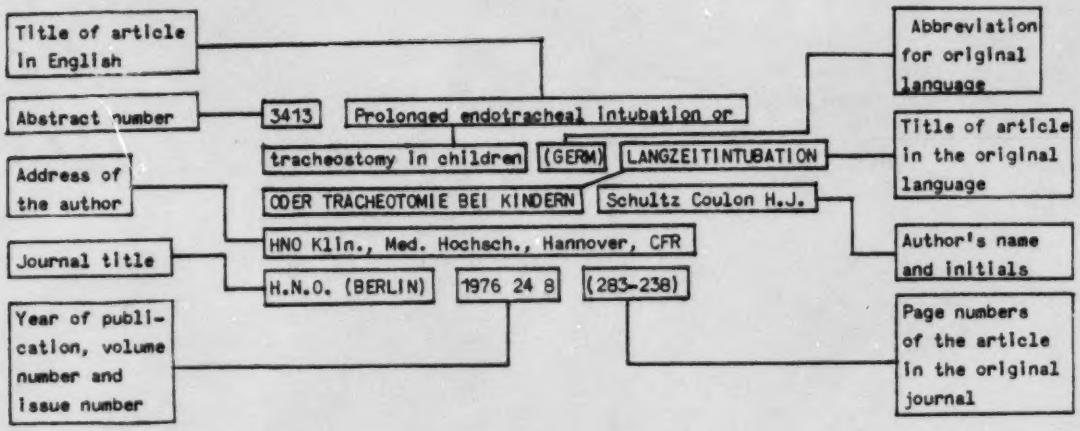
EXAMPLE OF A TABLE-OF-CONTENTS PAGE



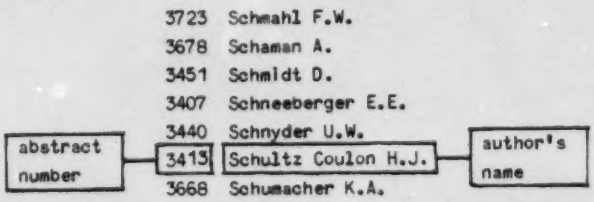
EXAMPLE OF THE SUBJECT INDEX


laparotomy, abdominal surgery, coltagen disease, fibrosis, mesothelium peritoneum adhesion, pathogenesis, histology, 2 children 3542
laryngitis, endotracheal intubation, subglottic stenosis, trachea injury, trachea stenosis, tracheostomy, laryngitis treatment, tracheostomy vs prolonged endotracheal intubation, stenosis as complication, age factors, 5 infants 3413
subjects
abstract number

EXAMPLE OF A CITATION


Title of article in English
Abstract number
3413
Prolonged endotracheal intubation or tracheostomy in children (GERM) LANGZEITINTUBATION ODER TRACHEOTOMIE BEI KINDERN
Schultz Coulon H.J.
Address of the author
HNO Klin., Med. Hochsch., Hannover, GFR
Journal title
H.N.O. (BERLIN)
1976 24 8
(283-238)
Year of publication, volume number and issue number
Abbreviation for original language
Title of article in the original language
Author's name and initials
Page numbers of the article in the original journal

EXAMPLE OF THE AUTHOR INDEX



THE 44 SECTIONS OF EXCERPTA MEDICA

SECTION NUMBER	TITLE	NUMBER OF VOLUMES PER YEAR
1	Anatomy, Anthropology, Embryology, and Histology	1
24	Anesthesiology	1
31	Arthritis and Rheumatism	1
27	Biophysics, Bio-engineering and Medical Instrumentation	1
16	Cancer	3
18	Cardiovascular Diseases and Cardiovascular Surgery	2
15	Chest Diseases, Thoracic Surgery and Tuberculosis	2
29	Clinical Biochemistry	3
13	Dermatology and Venereology	1
21	Developmental Biology and Teratology	1
40	Drug Dependence	1
3	Endocrinology	2
46	Environmental Health and Pollution Control	2
50	Epilepsy	1
49	Forensic Science	1
48	Gastroenterology	2
5	General Pathology and Pathological Anatomy	3
20	Gerontology and Geriatrics	1
36	Health Economics and Hospital Management	2
25	Hematology	2
22	Human Genetics	2
26	Immunology, Serology, and Transplantation	2
6	Internal Medicine	2
4	Microbiology: Bacteriology, Mycology and Parasitology	2
8	Neurology and Neurosurgery	3
23	Nuclear Medicine	2
10	Obstetrics and Gynecology	2
35	Occupational Health and Industrial Medicine	1
12	Ophthalmology	1
33	Orthopedic Surgery	1
11	Otorhinolaryngology	2
7	Pediatrics and Pediatric Surgery	2
30	Pharmacology and Toxicology	3
2	Physiology	3
34	Plastic Surgery	1
32	Psychiatry	2
17	Public Health, Social Medicine and Hygiene	2
14	Radiology	2
19	Rehabilitation and Physical Medicine	1
9	Surgery	2
28	Urology and Nephrology	1
47	Virology	1
38	Adverse Reactions Titles*	1
37	Drug Literature Index*	1

*This title is a drug literature bibliography, and although it is assigned a Section number, it is not a part of the abstract journal series.

EXCERPTA MEDICA
P.O. Box 3085 Princeton, NJ 08540

IV. In a recent issue of Biological Abstracts:

A. Read the instructions for use of the five indexes to Biological Abstracts, i.e.:

1. Author Index
2. Biosystematic Index
3. Generic Index
4. Concept Index
5. Subject Index

Compare the printed form of the abstracts section of Biological Abstracts with the bibliography section of BioResearch Index.

B. Biological Abstracts (BA) exercise.
Record the volume number, issue number, and date of the part of BA you use for the following work:

Vol._____ Issue No._____ Date_____

1. Select from the "Author Index" an author and one corresponding abstract number:

   Author's name_____

   Abstract number_____

2. Find the abstract corresponding to the abstract number given above. Observe and write below the broad subject heading under which it appears.

   _____

   _____

   _____

3. Observe, and write below, the following information taken from the printed abstract you have chosen:

   Abstract number_____

   All authors' names_____

   _____

   _____

   _____

   _____

52

Place where the work was done:

_____

_____

_____

_____

_____

Title of article: _____

_____

_____

_____

Source of article: _____

_____

_____

_____

Beginning words of the abstract:

_____

_____

_____

Determine if any organism is named in the abstract or title. If there is one, write it here:

_____

_____

_____

4. Using the "Biosystematic Index," locate the same abstract number. Copy that entry as it appears in the "Biosystematic Index" and write the entry below:

_____

_____

_____

_____

5. Using the "Generic Index," locate the same abstract number. Copy the entry as it appears in the "Generic Index." If it does not appear, state why.

_____

_____

_____

6. Using the "Concept Index," find the broad heading under which the abstract is listed. Then, having read the abstract in step 3 of this assignment, determine another broad heading which might also characterize the article.

Heading _____

_____

Heading _____

_____

Some common abstract numbers for the two headings (including the one for the abstract you have chosen):

_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

7. Using the "Subject Index," determine the words under which the abstract you have selected can be found. (Remember that words for the permuted "Subject Index" come from the title and can also be added keywords supplied by the indexers mostly from the abstract.)

List below appropriate subject terms which you have identified:

_____

_____

_____

_____

_____

_____

_____

_____

Indicate which term(s) would have led quickest to the abstract:

_____

_____

_____

_____

PART III

COMPUTER SEARCHING

Introduction: Computer Searching

Successful online computer searching requires four levels of understanding. The first level concerns a generalized picture of the machine interactions which makes computer searching possible. The second level considers the commands of the searching language as they are used to extract, manipulate, test and produce bibliographies or other lists from the information stored in the computer. The third level relates to the structure, access and content of multiple groups of databases stored in the computer. The fourth level deals with the strategy of expressing the meaning of a human information need so that computer stored information is cost-effectively selected out to satisfy that information need. Each successive level of understanding listed above is more difficult to master.

This section of the workbook introduces some basic information relevant to mastering the four levels of understanding just described. Its goal is to prepare the student so that (s)he can plan and execute a satisfactory, supervised computer search on a self-chosen topic. The searching language used is DIALOG. It was chosen because it provides access to more databases than ORBIT or BRS, the remaining two major publically available searching languages in the United States. Since the course, of which this workbook is a part, has been designed for university level science majors, there is no assumption that its enrollees will become professional searchers of computer accessible information. Normally, searching at the professional level would require much more extensive training and practice than provided here.

The sequence and topics covered in this section are as follows:

"Online Computer Searching--First Overview, Part I" introduces the fundamental steps used in performing a computer search as well as an example illustrating these steps. Part I is designed to be given as part of the first class meeting of the course without reference to the searching hardware or the specifics of a searching language.

"Online Computer Searching--First Overview, Part II" is intended for the second class meeting. The checklist approach is used to discuss the basic methods and sequences which the searcher uses to prepare for online computer searching. It is also intended as a mechanical review-aid, for use when the student performs his or her own computer searching. Part II is designed to be discussed while at a terminal using demonstration searches. The explanatory annotated search records illustrating the concepts of broadening and narrowing a search strategy are intended for student reference during the demonstration searches as well as for review after the class session.

"Basic Techniques of Computer Searching Using Lockheed's DIALOG System, Part I" examines the unit record, its access using logical operators and DIALOG's BEGIN, SELECT SuperSELECT and COMBINE commands. The use of parentheses is also introduced as the technique to override DIALOG's default processing of mixed logical operators. These elements of the searching language are presented in the context of preparing a search strategy which fails at the computer. The example of an abortive computer search aims at focusing the student's attention on the critical importance of understanding database characteristics and the skills needed to express an information need as a search strategy. The exercise assigned provides practice in search plan writing, using the

commands introduced and logical operators. Readings in Lockheed's Guide to DIALOG Searching are subsequently assigned as homework. All major commands, truncation, and full-text searching are included in the assignment.

"Basic Techniques of Computer Searching Using Lockheed's DIALOG System--Part II", assumes the background reading on the DIALOG search language, and concentrates on the preparation of the search plan. The components of design in computer searching are emphasized by a detailed step by step reformulation of the unsuccessful search of the previous class session. Multi-database searching is introduced and illustrated through the actual record of the search resulting from the search plan. The exercise assigned as homework again emphasizes preparation of the search plan, this time using many of the important DIALOG search language features.

The NTIS database exercise provides teams of two or three students the opportunity to put into practice what they have learned in the preceeding sections. After a short introduction to the database and its complexities, each team of students is assigned a search topic in a field unrelated to their majors. Working with assigned instructors, the teams are responsible for researching the search topic, studying the appropriate thesauri, formulating the main search strategy and backup search strategies, dialing up a telecommunications network, entering the search plan on the terminal, interpreting the computer's responses, changing the search strategy (if necessary), and commanding a full format offline print. Later, the instructors review the printed bibliography with the student teams. The NTIS database exercise provides the practical foundation for the less closely supervised computer search project which students plan, research and execute during subsequent weeks of the course.

ONLINE COMPUTER SEARCHING
FIRST OVERVIEW
PART I

Goal of Online Computer Searching: To satisfy an information need by producing a computer derived bibliography or other data.

General Procedure for Computer Searching

(Refer to the attached computer search record for examples illustrating the terminology used.)

a) choose the search terms[1] which best express the concepts implied by the stated information need; b) specify by logic or other means how these terms shall co-occur or not co-occur in the individual unit records[2]; c) choose an appropriate data base[3]; d) use the commands of a computer searching language to input terms and their relationships (the computer will then report the results of its search of term indexes to unit records); e) command the computer to print out relevant portions of unit records which have been identified through a successful database search; f) repeat this procedure for other data bases determined to be appropriate.

---

1. Terms include words, word combinations, proper names, numerals, letters or codes.

2. A unit record may identify and describe a document or part of a document, e.g., a book, a journal article, a map. In some cases, the unit record is itself the document; it provides information that is readily available only in machine readable form. Technically, a unit record itself is a set of data elements, the content and structure of which is determined by a group of rules.

3. A data base, ideally, is a group of sequentially arranged unit records, all of which relate to a well-defined set of subjects.

Information Need: Publications on the
Use of Passive Solar Energy in Greenhouses

File10:AGRICOLA 70-78/DEC 1 (1) *Data base selected*

Set Items Description (+=OR;*=AND;-=NOT)

? (ss 2) (passive 3) (and 4) (solar 3) (or 4) (sun 3) (and 4) (greenhouse? 3) (or 4) (glasshouse? 3)

2 *Computer search language command*
3 *Search terms*
4 *Logic*

(5)
1 332 PASSIVE
2 1136 SOLAR
3 291 SUN
4 3726 GREENHOUSE?
5 569 GLASSHOUSE?

(5) *Computer report on number of unit records indexed by specified terms in the AGRICOLA database.*

6 4 1 AND (2 OR 3) AND (4 OR 5) (6)

(6) *Computer report on terms' co-occurrence as required by the logic used.*

? (t6/5/1-4) (7) *Computer search language command.*

6/5/1
1491041 TH7413.C6 1977 ID No: 78-9140506
Passive greenhouse design in the Great Lakes region .in Kalamazoo, Michigan.; a case study .Solar heating and energy. (8)
MacMath, R
In Proceedings of the Conference on Energy-Conserving Solar-Heated Greenhouses p. 209-215. 1977
TH7413.C6 1977
Search: 19770000
Source: OTHER US Doc Type: ARTICLE
Cat Codes: 5505
Descriptors: Michigan

6/5/2
1491024 TH7413.C6 1977 ID No: 78-9140489
Hybrid passive systems. II. Close control design criteria establishing cost effective solar heating--the hybrid-delta line Solar greenhouse used to heat a home.
Taff, D C: Holdridge, R B
In Proceedings of the Conference on Energy-Conserving Solar-Heated Greenhouses p. 63-66. 1977
TH7413.C6 1977
Search: 19770000
Source: OTHER US Doc Type: ARTICLE
Cat Codes: 5505

(8) *Print out of the first two unit records resulting from the search on the AGRICOLA database.*

ONLINE COMPUTER SEARCHING
FIRST OVERVIEW

PART II

Basic Steps for Computer Searching

(Refer to the attached search plans and computer search records for examples illustrating the terminology used.)

1. Understand thoroughly what information is to be supplied from the requested computer search. In other words, analyze the meaning of the search query so that you understand the information need to be satisfied.

2. Choose one or more databases which are most likely to contain the needed information within their unit records.

3. Choose a search service offering the most useful access to the unit records of the databases chosen.

4. Create a search strategy designed to capture the information needed. This requires researching the subject of the search, choosing search terms, relating them logically, and formatting them in the search language. (This section will be expanded in detail, later in the course.)

5. Prepare alternative, back-up search strategies. These will be used in case the first search strategy produces unacceptable results.

6. Prepare a script or plan which shows each step of the search strategy you plan to use. Also prepare scripts for back-up, alternative strategies.

7. Choose an appropriate telecommunications network to provide time-shared telephone contact with the chosen search service.

8. Turn on the computer terminal. The terminal is a machine with a keyboard similar to that of a typewriter. It is used to send messages to computers and to display their responses.

9. Turn on the modem. This is a device which translates your terminal typing into electronic signals which are then sent via telephone lines to a search service's computer. In turn, the search service's computer sends electronic signals to the modem which translates them into a displayed natural language response on your terminal.

10. Dial the telecommunications network.

11. Listen for the high-pitched telecommunications network tone. On hearing the tone, place the telephone receiver in the modem.

12. Enter the information required by the telecommunications network for connection to the search system chosen.

13. Enter an appropriate password.

14. Read the confirmation of the password and any news message which is displayed by the search system.

15. Choose a database.

16. Enter on the terminal keyboard, the terms, term relationships, logic and commands exactly as shown in the search plan or script.

17. Press the carriage return to transmit each completed step of the search to the computer.

18. Read carefully the results reported by the computer after it processes each transmitted step. Correct errors or results of garbled transmission, i.e. noise.

19. Sample the unit records resulting from the completed search strategy. Scan them for relevance to the information needed or for terms to be added to improve the search strategy.

20. a) If sufficient unit records are found to satisfy the information need, confirm the strategy--or--
b) If the information need is not satisfied, change the strategy or terminate the computer session. (The search strategy can be saved on the system's computers if desired.)

21. If the search strategy is successful, decide whether to print the unit records on-line, i.e., at the terminal, or, off-line, i.e., on the search service's printer for subsequent mailing of the search results to you.

22. Choose another database for further searching or end the computer search session.

Computer Search Record - Main Strategy Chosen

Information Need: Technical Reports on the Dangers of Liquified Natural Gas

```
TELENET
213 SE

TERMINAL=decw

c 415 20

415 20 CONNECTED

ENTER YOUR DIALOG PASSWORD
xxxxxxxx

xxxxxxxx LOGON File1 Mon 27aug79  11:15:06

FREE TIME ON 3 FILES (HALF-HOUR EACH):
NEWSEARCH (FILE 211), LISA (FILE 61), +
CONE,PAP INDEX (FILE 77), SEE ?NEWS.

? b6

        27aug79 11:15:16 User7380
  $0.06  0.004 Hrs File1*
File6:NTIS 64-79/ISS18
(Copr. NTIS)
        Set Items Description (+=OR;*=AND;-=NOT)
        --- ----- ---------------------------------
? ss liquified(w)natural(w)gas or liquefied(w)natural(w)gas or lng

          1      8 LIQUIFIED(W)NATURAL(W)GAS
          2    235 LIQUEFIED(W)NATURAL(W)GAS
          3    120 LNG
          4    283  1 OR 2 OR 3
? ss accident? or hazard? or risk? or danger? or explod? or explos?

          5   7598 ACCIDENT?
          6   8118 HAZARD?
          7   1813 RISK?
          8     90 DANGER?
          9    295 EXPLOD?
         10  12200 EXPLOS?
         11  27538  5 OR 6 OR 7 OR 8 OR 9 OR 10
? ss spill? or fire? or earthquake? or seism? or fault? or pollut?

         12   1259 SPILL?
         13   6951 FIRE?
         14   3466 EARTHQUAKE?
         15   6162 SEISM?
         16   2307 FAULT?
         17  30972 POLLUT?
         18  46503  12 OR 13 OR 14 OR 15 OR 16 OR 17
? c 4 and (11 or 18)
         19     92  4  and (11 or 18)
```

1) *Information entered at the terminal as required by the TELENET telecommunications network. "decw" codes the terminal type used by the searcher. "c 415 20" codes a request for connection to the DIALOG Search System.*

2) *DIALOG password is entered in a masked area provided by DIALOG.*

3) *DIALOG confirmation of the password by the LOGON statement. Important news is then provided. Additional or more detailed news can be requested by entering the command "?NEWS".*

4) *The command "b" followed by a file number, selects file 6, the NTIS database on technical reports. Selection of this database is confirmed by DIALOG with a report of the years and issues available for searching.*

5) *Each lower case line indicates the command, terms and logic entered by the searcher. At the end of each line the carriage return is pressed to transmit the message to the DIALOG computer. Upper case lines indicate the terms and logic received by the DIALOG computer and the number of unit records indexed for the terms and logic specified by the searcher.*

? t19/8/1-5 (6)

(6) *Command to sample online the titles and subjects of the first five unit records of the set specified by the computer search.*

```
19/8/1
UCRL-52570   NTIS Prices: PC A04/MF A01 (7)

Evaluation of Sites for [LNG] [Spill] Tests

Descriptors:  *Gas [spills], [*Liquefied natural gas], Nevada test site,
Research programs, Site selection, Test facilities, Testing

Identifiers: ERDA/030800, Environmental surveys, NTISDE

19/8/2
UCRL-82031   NTIS Prices: PC A02/MF A01

Numerical Modeling of [LNG] [Spill] Phenomena

Descriptors: *Gas [spills], [*Liquefied natural gas], Boiling, Diffusion,
Mathematical models, Research programs, Vapors

Identifiers: ERDA/030800, ERDA/500200, NTISDE

19/8/3
UCID-17968-78-1   NTIS Prices: PC A03/MF A01

Liquefied Energy Fuels [Spill] Effects Program.  Quarterly Report,
July--September 1978

Descriptors: *Gas [spill], [*Liquefied natural gas], *Samplers, Design,
Detonations, Environmental effects, Research programs, Sampling

Identifiers: ERDA/030800, Gas sampling, NTISDE
```

(7) *First three records sampled from the search. Titles and subjects are scanned for relevance to the information need, and for terms which might be added to the search to produce additional relevant unit records. (New terms are added only if the chances of producing relevant unit records outweighs the risk of producing irrelevant unit records.) Terms found by the computer to satisfy the search requirements are outlined by rectangles.*

? pr19/5/1-92 (8)

Printed19/5/1-92

(8) *The command to print offline all 92 records indicates the searcher has made the judgment that the search will satisfy the information need.*

? logoff hold (9)

27aug79 11:22:07 User7380

(9) *Termination of the search by the command "LOGOFF HOLD." Adding the word "HOLD" saves the strategy on DIALOG computers for 10 minutes.*

Computer Search Record--Alternative Strategy for *Broadening* the Search

The alternative search strategy to broaden a search is normally implemented when too few unit records are found as a result of using the main search strategy. The judgment that too few unit records have been found is based upon expected publication activity on the topic of the search.

Terms used in the broadening of the search are related to the information needed, but, due to their broadness or peripheral aspects, include additional subjects which are irrelevant to the topic of the search.

In the search record, reproduced on the attached pages, the main search is first displayed. As indicated, it resulted in 92 records satisfying the search strategy. Next, the broadening terms are entered, and the results are added to those from the main search strategy. This yields 135 unit records for an increase of 43.

A sampling of these new unit records shows that the first 8 unit records are either marginally relevant or irrelevant. Unit records 9 and 12 are both relevant and significant. They would have been missed using the main search strategy.

The broadening of a search, as shown, illustrates a normal result. Slightly increasing the number of relevant unit records by the use of broad terms is accomplished only by a larger increase in irrelevant or marginally relevant unit records. In some cases, broadening a search is both justified and required. It should always be planned as a possible alternative to the main search strategy adopted.

```
? bb

         29aug79 12:33:02 User7380
  $0.06  0.004 Hrs File6
File6:NTIS 64-79/ISS18
(Copr. NTIS)
         Set Items Description (+=OR;*=AND;-=NOT)

? .execute stepst0uh/1-18

            1      8 LIQUIFIED(W)NATURAL(W)GAS
            2    235 LIQUEFIED(W)NATURAL(W)GAS
            3    120 LNG
            4    283  1 OR 2 OR 3
            5   7598 ACCIDENT?
            6   8118 HAZARD?
            7   1813 RISK?
            8     90 DANGER?
            9    295 EXPLOD?
           10  12200 EXPLOS?
           11  27538  5 OR 6 OR 7 OR 8 OR 9 OR 10
           12   1259 SPILL?
           13   6951 FIRE?
           14   3466 EARTHQUAKE?
           15   6162 SEISM?
           16   2307 FAULT?
           17  30972 POLLUT?
           18  46503  12 OR 13 OR 14 OR 15 OR 16 OR 17
? c 4 and (11 or 18)

           19     92  4 AND (11 OR 18)

? ss safety or insurance or collision? or tanker? or supertanker?

           20  26737 SAFETY
           21   1917 INSURANCE
           22   6347 COLLISION?
           23    602 TANKER?
           24     61 SUPERTANKER?
           25  33978  20 OR 21 OR 22 OR 23 OR 24

? c 4 and (11 or 18 or 25)

           26    135  4 AND (11 OR 18 OR 25)

? c 26 not 19

           27     43  26 NOT 19

? ss (1 or 2 or 3) and (4 or 5 or 6 or 7 or 8 or 9 or 10) and (11 or 12 or 13 or 14 or 15 or 16 or 17) and (18 or 19 or 20 or 21 or 22 or 23 or 24 or 25)

           28     43  (1 OR 2 OR 3) AND (4 OR 5 OR 6 OR 7 OR 8 OR 9 OR 10) AND (11 OR 12 OR 13 OR 14 OR 15 OR 16 OR 17) AND (18 OR 19 OR 20 OR 21 OR 22 OR 23 OR 24 OR 25)

? t 28/3/1-43

 28/3/1
 AN - 1979-0705
 TI - Liquefied natural gas safety and risk assessment
 AU - Boe, G. P.
 CS - Arthur D. Little, Inc., Cambridge, Mass.
 SO - Report, Jan. 1979, 100 p.
 AV - NTIS
 CC - 0202
 AB - Liquefied natural gas (LNG) is a cryogenic liquid that is transported by ship and stored in large tanks at terminals. Safety and risk assessment of LNG facilities is a complex subject because of the many factors involved. This report discusses the safety and risk assessment of LNG facilities in terms of the following: (1) the properties of LNG and its vapor; (2) the hazards associated with LNG; (3) the safety record of LNG facilities; (4) the safety and risk assessment methodology; (5) the safety and risk assessment of LNG facilities; and (6) the safety and risk assessment of LNG ships. The report concludes that LNG facilities can be designed and operated safely and that the risk to the public is very low.

 28/3/2
 AN - 1979-0704
 TI - Liquefied natural gas safety and risk assessment
 AU - Boe, G. P.
 CS - Arthur D. Little, Inc., Cambridge, Mass.
 SO - Report, Jan. 1979, 100 p.
 AV - NTIS
 CC - 0202
 AB - Liquefied natural gas (LNG) is a cryogenic liquid that is transported by ship and stored in large tanks at terminals. Safety and risk assessment of LNG facilities is a complex subject because of the many factors involved. This report discusses the safety and risk assessment of LNG facilities in terms of the following: (1) the properties of LNG and its vapor; (2) the hazards associated with LNG; (3) the safety record of LNG facilities; (4) the safety and risk assessment methodology; (5) the safety and risk assessment of LNG facilities; and (6) the safety and risk assessment of LNG ships. The report concludes that LNG facilities can be designed and operated safely and that the risk to the public is very low.

 28/3/3
 AN - 1979-0703
 TI - Liquefied natural gas safety and risk assessment
 AU - Boe, G. P.
 CS - Arthur D. Little, Inc., Cambridge, Mass.
 SO - Report, Jan. 1979, 100 p.
 AV - NTIS
 CC - 0202
 AB - Liquefied natural gas (LNG) is a cryogenic liquid that is transported by ship and stored in large tanks at terminals. Safety and risk assessment of LNG facilities is a complex subject because of the many factors involved. This report discusses the safety and risk assessment of LNG facilities in terms of the following: (1) the properties of LNG and its vapor; (2) the hazards associated with LNG; (3) the safety record of LNG facilities; (4) the safety and risk assessment methodology; (5) the safety and risk assessment of LNG facilities; and (6) the safety and risk assessment of LNG ships. The report concludes that LNG facilities can be designed and operated safely and that the risk to the public is very low.
```

Search terms and logic of main search strategy. The result is 92 unit records satisfying this strategy.

Terms and logic of the broadened search strategy.

Results of adding broad terms are 135 unit records satisfying the new strategy.

Number of new unit records resulting from broadening the search strategy.

? t27/8/1-5

27/8/1
PB-295 941/9ST NTIS Prices: PC A05 MF A01

Custody Transfer Systems for Lng-Ships? Tank Survey Techniques and Sounding Tables

Descriptors: *Tanker ships, *Liquefied natural gas, *Storage tanks, Volume, Gas analysis, Cryogenics, Calibrating, Mathematical models, Analytical photogrammetry, Tables(Data)

IRRELEVANT

Identifiers: Strapping measurement, NTISCOMMBS

27/8/2
PB-295 483/2ST NTIS Prices: PC A12/MF A01

Alternative Liquefied Gas Cargos: Management Strategies and Vessel Design Philosophies

Descriptors: *Liquefied gases, *Marine transportation, *Tanker ships, Liquefied natural gas, Liquefied petroleum gases, Liquid ammonia, Shipbuilding, Structural design, Economic analysis

MARGINALLY RELEVANT

Identifiers: NTISCOMMA

27/8/3
PB-294 398/3ST NTIS Prices: PC A06/MF A01

Analysis of LNG Carrier Docking Performed on CAORF Ship Simulator

Descriptors: *Tanker ships, *Ship maneuvering, Liquefied natural gas, Wind direction, Ship piers, Tugboats, Wind velocity, Training simulators

MARGINALLY RELEVANT

Identifiers: *Ship docking, NTISCOMMA

27/8/4
ANL/IAPE/TM-78-1 NTIS Prices: PC A12/MF A01

High-Btu Gas Supply Systems: The Characterization and Social Cost of Selected Options for Providing Gas to a Medwestern Terminus

Descriptors: *Coal gasification, *High btu gas, Allocations, Bituminous coal, Charges, Comparative evaluations, Consumption rates, Cost, Energy supplies, Exports, Forecasting, Gulf of Mexico, Imports, Lignite, Liquefied natural gas, Lurgi process, Natural gas, Natural gas distribution systems, Offshore operations, Pipelines, Production, Regional analysis, Reserves, Social impact, Socio-economic factors, Synthetic fuels, Tanker ships

IRRELEVANT

Identifiers: ERDA/010404, ERDA/530100, ERDA/290200, NTISDE

27/8/5
AD-A061 420/6ST NTIS Prices: PC A05/MF A01

The Effects of Multiple Weld Repairs on the Aluminum-Magnesium Alloy 5083-O

MARGINALLY RELEVANT

Descriptors: *Aluminum alloys, *Magnesium alloys, *Welds, Repair, Containment(General), Liquefied natural gas, Tankers, Microstructure,

Theses

Identifiers: NTISD0DXA

? t27/8/6-15

27/8/6
SAN-W1364-01 NTIS Prices: PC A16/MF A01

Liquefied Natural Gas Wind Tunnel Simulation and Instrumentation Assessments

MARGINALLY RELEVANT

Descriptors: *Liquefied natural gas, *Wind tunnels, *Safety engineering, Diffusion, Flames, Measuring instruments, Meteorology, Salton Sea, Site selection, Trade, Uses, Vapors

Identifiers: ERDA/030500, Tests, NTISDE

27/8/7
PB-283 875/3ST NTIS Prices: PC A05/MF A01

Natural Gas Shortage

MARGINALLY RELEVANT

Descriptors: *Energy shortages, *Natural gas, *Calforonia, *Liquefied natural gas, Energy supplies, Supply(Economics), Regional planning, Safety, Economics, Economic analysis, Legislation, Site surveys, Financing

Identifiers: Site selection, NTISSLLC

27/8/8
AD-A057 665/2ST NTIS Prices: PC A11/MF A01

Evaluation of Deepwater Ports Mooring Load Monitoring and Prediction Systems

MARGINALLY RELEVANT

Descriptors: *Mooring, *Marine terminals, Monitoring, Anchors(Marine), Towers, Loads(Forces), Deep water, Measurement, Telemeter systems, Rope, Failure, Predictions, Strain gages, Mooring buoys, Warning systems, Tankers, Petroleum products, Imports, Harbors, Liquefied natural gas

Identifiers: Ports, Deepwater oil terminals, Mooring lines, Hawsers, Mooring load monitoring systems, MLMS(Mooring Load Monitoring Systems), NTISD0DXA

27/8/9
AD-A057 426/9ST NTIS Prices: PC A20/MF A01

Preliminary Evaluation of Wind and Wave Effects at Potential LNG Terminal Sites, State of California. Appendix B: An Evaluation of the Relative Wave Climate at Six Offshore LNG Sites Considering Island Influences and Topographic Effects

RELEVANT

Descriptors: *Marine terminals, *Site selection, *Ocean waves, Height, Probability, Wind velocity, Climate, Santa Barbara Islands, Topography, Offshore, Deep water, Peak values, Refraction, Oceanographic data, Seasonal variations, Piers, Floating bases, Barges, Towers, Mooring, Tankers, Ship motion, Liquefied natural gas, Legislation, California, Coastal regions

Identifiers: Wind Waves, Hindcasting, Santa Barbara Channel, Swells(Marine), NTISD0DXA

27/8/10
PB-283 474/5ST NTIS Prices: PC A06/MF A01

LNG Single Point Mooring Terminal - Report on Initial Studies

Descriptors: *Tanker ships, *Mooring, *Liquefied natural gas, Fuel hose, Self sealing disconnect fittings, Offshore structures, Design criteria, Pipeline transportation MARGINALLY RELEVANT

Identifiers: *Single point mooring systems, NTISCOMMA

27/8/11
PB-282 306/0ST NTIS Prices: PC A13/MF A01

World LPG Forecast and Implications for the U.S. Merchant Marine, 1978-1990 IRRELEVANT

Descriptors: *Liquefied petroleum gases, *Fuel consumption, *Shipbuilding, Tanker ships, Propane, Butane, Forecasting, Liquified natural gas, Shipyards, Economic analysis, Regulations, International trade, Sources, Design criteria, Markets, Mathematical models

Identifiers: Fuel demand, Foreign trade, NTISCOMMA

27/8/12
AD-A054 130/0ST NTIS Prices: PC A20/MF A01

Preliminary Evaluation of Wind and Wave Effects at Potential LNG Terminal Sites, State of California Appendix A: An Evaluation of the Relative Wave Climate at Five Onshore LNG Sites Considering Island Influences and Topographic Effects RELEVANT

Descriptors: *Marine terminals, *Site selection, *Ocean waves, Height, Wind velocity, Climate, Peak values, Diurnal variations, Meteorological data, Oceanographic data, Tables(Data), Deep water, Tankers, Liquefied natural gas, Specifications, Legislation, California

Identifiers: NTISDODXA

Computer Search Record - Alternative Strategy for *Narrowing* the Search

The alternative search strategy to narrow a search is normally entered when the terms used produce an unacceptable number of unit records which are irrelevant to the information need. Additionally, if the cost of producing the search is a significant factor and the number of relevant unit records satisfying the search is unexpectedly large, a narrowing, alternative search is used. The sample record attached is an example of the second case.

When attempting to reduce the number of relevant unit records to lower the cost of a search, a very simple strategy should be used. Otherwise, the cost of entering the narrowing search strategy online could exceed the savings resulting from the reduction of the number of unit records printed. Limiting the number of relevant unit recrods printed by date of publication or by language of the publication are frequently employed techniques. For example, the searcher may specify publication dates limited to the last three years or publications written in the English language only.

A few data bases provide distinctions between subject terms assigned when a) the topic is a major emphasis of the document being characterized or b) the topic is not a major emphasis of the document being characterized. When such subject terms are provided they are called "weighted descriptors." The NTIS data base provides weighted descriptors, and this option is used to narrow the search results in the attached sample search record.

The search record begins by first displaying the results of the main search strategy chosen. This results in 92 records, the sampling of which indicates a high frequency of relevant unit records. (See the record of the main computer search strategy). By entering the "L" for LIMIT and the code "/maj", we limit all terms dealing with dangers to those assigned when the dangers were a major emphasis of the document being characterized. This results in narrowing the specifications of the search so that only 43 unit records satisfy the new search strategy.

Strategy for narrowing the search strategy should always be included in the search script. Options for narrowing the search strategy differ by database and commands used to narrow the search may also differ. For these reasons, a careful study of the means for limiting a search strategy within a given database is essential.

```
? bb

         4sep79  11:10:54 User7380
  $0.21  0.014 Hrs File6
File6:NTIS 64-79/ISS18
(Copr. NTIS)
         Set Items Description (+=OR;*=AND;-=NOT)

? .execute stepst0as/1-18

        1      8 LIQUIFIED(W)NATURAL(W)GAS
        2    235 LIQUEFIED(W)NATURAL(W)GAS
        3    120 LNG
        4    283  1 OR 2 OR 3
        5   7598 ACCIDENT?
        6   8118 HAZARD?
        7   1813 RISK?
        8     90 DANGER?
        9    295 EXPLOD?
       10  12200 EXPLOS?
       11  27538  5 OR 6 OR 7 OR 8 OR 9 OR 10
       12   1259 SPILL?
       13   6951 FIRE?
       14   3466 EARTHQUAKE?
       15   6162 SEISM?
       16   2307 FAULT?
       17  30972 POLLUT?
       18  46503  12 OR 13 OR 14 OR 15 OR 16 OR 17

? c 4 and (11 or 18)

       19     92  4 AND (11 OR 18)

? 11l/maj

       20  12661 11L/MAJ
? 118/maj
       21  26379 18/MAJ

? c 4 and (20 or 21)

       22     43  4 AND (20 OR 21)
```

(1) *The main search strategy which results in 92 unit records. Sampling indicates that a high frequency of relevant unit records occur within set 19.*

(2) *Sets 11 and 18 are limited to those unit records containing weighted descriptors.*

(3) *The narrowing search strategy reduces the number of unit records by more than 50%.*

? t22/8/1-5

22/8/1
UCRL-52570 NTIS Prices: PC A04/MF A01

Evaluation of Sites for LNG Spill Tests

Descriptors: *Gas spills, *Liquefied natural gas, Nevada test site, Research programs, Site selection, Test facilities, Testing

Identifiers: ERDA/030800, Environmental surveys, NTISDE

22/8/2
UCRL-82031 NTIS Prices: PC A02/MF A01

Numerical Modeling of LNG Spill Phenomena

Descriptors: *Gas spills, *Liquefied natural gas, Boiling, Diffusion, Mathematical models, Research programs, Vapors

Identifiers: ERDA/030800, ERDA/500200, NTISDE

22/8/3
UCID-17968-78-1 NTIS Prices: PC A03/MF A01

Liquefied Energy Fuels Spill Effects Program. Quarterly Report, July--September 1978

Descriptors: *Gas spills, *Liquefied natural gas, *Samplers, Design, Detonations, Environmental effects, Research programs, Sampling

Identifiers: ERDA/030800, Gas sampling, NTISDE

22/8/4
PB-292 407/4ST NTIS Prices: PC A02/MF A01

Railroad Accident Report - Derailment of Louisville and Nashville Railroad Company's Train No. 584 and Subsequent Rupture of Tank Car Containing Liquefied Petroleum Gas, Waverly, Tennessee, February 22, 1978

Descriptors: *Rail transportation, *Cargo transportation, *Accident investigations, Freight cars, Tank cars, Liquefied natural gas, Ignition, Explosions, Crack propagation, Overpressure, Casualties, Tennessee

Identifiers: *Railroad accidents, *Railroad derailments, Waiverly(Tennessee), NTISNTSB

22/8/5
UCID-17891(Rev.1) NTIS Prices: PC A02/MF A01

Spreading and Differential Boil-off for a Spill of Liquid Natural Gas on a Water Surface

Descriptors: *Gas spills, *Liquefied natural gas, Computer codes, Accidents, Evaporation, L codes, Mathematical models, Surfaces, Water

Identifiers: ERDA/030800, *Water pollution control, LNGVG computer program, NTISDE

4 *Sampling of the narrowed search strategy indicates that the danger terms now occur only as those characterizing the subject as a major emphasis. The symbol "*" indicates major emphasis.*

4

BASIC TECHNIQUES OF COMPUTER SEARCHING USING LOCKHEED'S DIALOG SYSTEM
PART I

Introduction

Earlier, we used the term, "unit record", to refer to the set of data elements printed on the catalog card. In Laboratory II, we will consider the unit record as it occurs in indexes, abstracts and computer searchable data bases. Next, we will discuss the indexing used to access these unit records both in printed and machine readable form.

We will then turn to a general definition of computer searching and begin examining the components of that definition, either analytically or by example.

First, logical operators, as a part of the definition, will be compared with their equivalent words in the English language. Some of the real differences in meaning will be contrasted.

After a preliminary section on developing the meaning of a set of search request statements, we will interrupt our analysis of the definition of computer searching, and consider an intuitively formulated computer search. We will use this search to illustrate the logical operators as they can be employed with the SELECT and COMBINE commands in Lockheed's DIALOG computer search system. We will also use the intuitive search plan as an illustration of the problems that can result from failure to analyze the meaning of a search query or to employ the capabilities of a search system in accessing unit records.

The Unit Record and its Indexing in Abstracts, Indexes and Computer Searchable Data Bases

A unit record can be defined as a set of data elements. Together, these data elements are used to indicate the existence, identification and characteristics of a group of data. For the purposes of this course, the groups of data indicated by unit records will be limited to publications such as books, articles, technical reports, or pamphlets.

In an earlier section of the course, we analyzed unit records in card catalogs. We now consider unit records which occur in printed abstracts or indexes, and in computer searchable data bases.

Unlike those in library catalogs, the unit records appearing in printed abstracts or indexes are not necessarily limited to works owned by a particular library. Thus, they usually do not include call numbers. (They may, however, include accession numbers or other codes which are used to purchase the publication indicated by the unit record.) Second, unit records in abstracts are not limited to works which are both physically and bibliographically independent. Therefore, they can include articles from journals and irregularly published serials, or, individual chapters and papers in books. Additionally, they may include short, factual summaries of the contents or results contained in a publication. The inclusion of such summaries distinguishes abstracts from indexes. Finally, abstracts or indexes may not use the same rules of bibliographic description, subject terms and filing order employed for unit records within library catalogs. However, data elements such as author, title, time and place of publication, may have a similar format to those found on library catalog cards.

Unit records in abstracts or indexes are published in book form. In most cases, these unit records are not reprinted once they are published, although usually the indexing for a given time period (frequently one year) is re-alphabetized or merged into one sequence.

Reproduced below this paragraph is a unit record from Oceanic Abstracts, and a unit record from Government Reports Announcements. Note that they are records of the same publication in the journal, Marine Biology, yet there are significant differences in the data elements provided. This illustrates another important characteristic of abstracts and indexes. They may record the existence of the same publication, but the unit records and the access to them via indexing may be constructed differently to serve the needs of disparate groups of clientele or to reflect differing information control policies.

Unit Record from Oceanic Abstracts

75-03392
Distribution and structure of benthic assemblages in Puget Sound, Washington, USA.
U. Lie (UNESCO, Div. of Oceanography, Place de Fontenoy, 75 Paris 7, Fr.).
MARINE BIOLOGY, 26(3):203-223, Aug. 1974. In English; abs., illus., refs., from AA. Also in: Contribution No. 761 from Univ. of Washington, Dept. of Oceanography, Seattle.

Benthic fauna were collected at 48 stations in Puget Sound, Washington State, during Feb-Mar. 1969. All the crustaceans, lamellibranchs, and echinoderms were identified and counted. Particle size distributions and N contents of the sediments, depths, and temperature and salinity of the bottom water were determined at all stations. Factor analysis was applied to abundance data for the 30 most frequently occurring species. The 1st factor had stations on shallow water mud bottoms, the 2nd factor on coarse sediment bottoms, and the 3rd on deepwater mud bottoms. The multiple correlation coefficients for each of the 3 sediments were 0.752, 0.897, and 0.706, respectively. The number of each species taken, species diversity, species groups, and standing crop data are presented. Only about 24% of the variability in standing crop could be attributed to variability in sediment types, N content of the sediments, salinity of the bottom water, and depth.

BENTHIC FAUNA, CRUSTACEA, ECHINODERMATA, PELECYPODA, PUGET SOUND, SEDIMENTS, SPECIES DIVERSITY, STD, WASHINGTON STATE

Unit Record from Government Reports Announcements

COM-75-11025/4GA PC$3.25
Washington Univ., Seattle. Dept. of Oceanography.
Distribution and Structure of Benthic Assemblages in Puget Sound, Washington, USA.
U. Lie. 1974. 23p WSG-TA-74-18, Contrib-761
NOAA-75070311
Prepared by Nordic Council for Marine Biology, Blomsterdalen (Norway). Espegrend Biological Station.
Pub. in Marine Biology, v26 p203-223 1974.

Descriptors: *Puget Sound, *Benthos, Tables(Data), Distribution(Property), Washington(State), Ecology, Depth, Surveys, Aquatic biology, Aquatic plants, Nitrogen, Temperature, Salinity, Marine microorganisms, Sediments, Sampling.
Identifiers: Sea Grant program, Ecosystems, Marine ecology, Reprints.

The article reports the results of an investigation to identify and map the major benthic communities in Puget Sound, to determine the distributional relationships among communities and environmental parameters, and to determine the ecologically significant groups of benthic species. Benthic infauna was collected with a 0.2 sq. meter van Veen grab at 48 stations in Puget Sound, Washington, during February-March 1969. All the crustaceans, lamellibranchs, and echinoderms were identified and counted. Particle size distributions and nitrogen contents of the sediments, depths, and temperature and salinity of the bottom water were determined at all stations. The first three factors of a factor analysis applied to between-stations measures of affinity, explained 41.28 percent of the total variance. The standing crop could be attributed to variability in sediment types, nitrogen content in the sediments, salinity of the bottom water, and depth.

Immediately below we consider a third unit record--again of the same publication. This time it is in the form of a print-out from a machine-readable data base called NTIS. The NTIS record as shown below has been accessed by computer using a search system called DIALOG.

NTIS

DIALOG FILE 6

SAMPLE RECORD

3/5/1

Distribution and structure of Benthic Assemblages in Puget Sound, Washington, USA ←--/TI

Washington Univ., Seattle, Dept. of Oceanography. National Oceanic and Atmospheric Administration, Rockville, Md. Office of Sea Grant. Nordic Council for Marine Biology, Blomsterdalen (Norway). Espegrend Biological Station (370 280) ←--/CS

AUTHOR: Lie, U. ←AU= CF=

CC=--> C509114 Fld: 08A, 06F, 47D, 57H, 86M GRAI 7520 ←JA=

1974 23p

RN=--> Rept No: WSG-TA-74-16, Contrib-761

CN=--> Monitor: NOAA - 75070311

AP=

Prepared by Nordic Council for Marine Biology, Blomsterdalen (Norway). Espegrend Biological Station.
Pub. in Marine Biology, v26 p203-223 1974.

Abstract: The article reports the results of an investigation to identify and map the major benthic communities in Puget Sound, to determine the distributional relationships amone communities and environmental parameters, and to determine the ecologically significant groups of benthic species. Benthic infauna was collected with a 0.2 sp. meter van Veen grab at 48 stations in Puget Sound, Washington, during February-March 1969. All the crustaceans, lamellibranchs, and echinoderms were identified and counted. Particle size distributions and nitrogen contents of the sediments, depths, and temperature and salinity of the bottom water were determined at all stations. The first three factors of a factor analysis applied to between-stations measures of affinity, explained 41.26 percent of the total variance. The standing crop could be attributed to variability in sediment types, nitrogen content in the sediments, salinigy of the bottom water, and depth.

Descriptors: Puget Sound, Benthos, Tables(Data), Distribution(Property), Washington(State), Ecology, Depth, Surveys, Aquatic biology, Aquatic Plants, Nitrogen, Temperature, Salinity, Marine microorganisms Sediments, Sampling ←--/DE

Identifiers: Sea Grant program, Ecosystems, Marine ecology, Reprints, NTISCOMNOA ←--/ID

RN=--> COM-75-11025/4ST NTIS Price: PC A02

RP=

You will note that this unit record contains all data elements from our second example of a unit record. There is good reason for this similarity. NTIS is the machine readable data base used to produce the printed publication, Government Reports Announcements. Of far greater importance to observe, are the many additional points of access; i.e., indexing, which DIALOG's NTIS provides in searching for the unit record. Let us consider what this means.

It is common for printed indexes or abstracts to provide index terms, such as subject and author, as access points to unit records. Many provide numeric and broad, subject-code access points as well. However, it is nearly a uniform characteristic of machine-readable data bases that they provide not only far larger numbers of indexed access points to a unit record, but retrieval through combinations of terms as access points.

Ready support for these statements is evident in the NTIS Unit Record we have just considered. Each of the areas outlined by a rectangle represents a computer searchable field, using DIALOG. DIALOG's computer searching name for these fields is shown by the symbols arrowed to each rectangle in the sample. These searchable fields are summarized in the table below. Here we find under the heading "field name" some sixteen different classes of indexed access points, all of which use terms in the unit record. Furthermore, since the DIALOG program separates most words, numerals or alphanumeric strings in the unit record and codes the order of their occurrence in each field, many more indexed access points are available through the use of symbols expressing sequential or locational relationships among them. The results of this treatment are observable in the examples column. The enormous increase in the number of access points to the unit record, over that supplied by printed indexes is thus immediately evident.

SUBJECT OR TEXT SEARCHING		
SUFFIX	FIELD NAME	EXAMPLES
None	Basic Index (includes all fields listed below)	S AQUATIC(W)BIOLOGY S MICROORGANISMS(F)SALINITY
/CS	Corporate Source	S ESPEGREND(W)BIOLOGICAL(W)STATION/CS
/DE	Descriptor @	S AQUATIC PLANTS S ECOLOGY/DE
/ID	Identifier	S SEA(W)GRANT/ID
/TI	Title	S BENTHIC(W)ASSEMBLAGES/TI

@/DE*retrieves weighted descriptors;/DF retrieves single-word descriptors;/DF*retrieves weighted single-word descriptors;/IF retrieves single-word identifiers.

CODE SEARCHING			
PREFIX	FIELD NAME	EXAMPLES	
AU =	Personal Author	E AU = LIE, U.	S AU=MENZEL, M.
CC =	Corporate Source Code	E CC = C5091	S CC=C509114
CF =	COSATI Field	E CF = 08	S CF=08A
CN =	Contract Number	E CN=NOAA-750703	S CN=NOAA-75070311
CP =	Contract No. Prefix	E CP=NOA	S CP=NOAA
JA =	Journal Announcement	E JA=U75	S JA=U7520
RN =	Report Number	E RN=WSG-TA	S RN=WSG-TA-74-16
RP =	Report No. Prefix	E RP=WS	S RP=WSG

Before concluding this discussion of the machine-readable unit record and its computer access through index terms, it is worth noting that the first four fields constitute the DIALOG Basic Index for this database. This is important to know when computer searching for unit records using DIALOG. When an individual enters terms during a search, DIALOG will use only the terms in the Basic Index, unless otherwise commanded. Such automatic features in a computer searching program are called "default" features.

Definition of Computer Searching

Having considered the unit record, its contents and its manual or computer access by indexing, we now specify a two step definition of computer searching for these unit records. The first step considers computer searching in relationship to its purpose. The second step considers computer searching in relationship to the expression of the meaning of the search query.

The purpose of computer searching is to find unit records which satisfy logical relationships of indexing terms. Computer searching is, therefore, basically: 1) selecting indexing terms which provide access points to unit records, and 2) combining these terms, using set logic, to specify how or whether such indexing terms shall co-occur in any individual unit record.

Now, in commanding the computer to select and logically combine terms, these terms and their logical relationships are communicated or transmitted only as strings of electronically coded symbols. No meaning is communicated. Thus, although the terms and logic necessarily have meaning to the searcher, their implications, their place in a hierarchy of terms, their synonyms, their acceptable or non-acceptable changes in grammatical form, etc. are unknown to the computer. It will search exactly as programmed and exactly as the signal sequences transmitted to it--no more, no less. Thus, our basic definition of computer searching above, is incomplete. The searcher does indeed select terms and combine them logically, but the searcher must also explicitly express the meaning of the search query, and accomplish this in such a way that it conforms to the program of the search system and the vocabulary of the data base.

We shall see how this is done: 1) by considering sets and examining the logic which relates sets to create new sets; 2) by discussing how search terms used to create sets are distinguished, grouped, expanded and related; and 3) by discussing the formatting of search terms and their relationship to the DIALOG program.

Sets and Logical Operators

A set can be described such that it has some countable, finite number of elements belonging to it from a given universe of elements. An example of a finite set description is the set of all students enrolled in universities during the year 1977. The elements of the set are the students enrolled in universities during that year. Although the number may be large, it is limited and, therefore, countable by some method.

A set may also be described which, for a given universe, has no elements. Such a set is called the null set or the empty set. An obvious example is the set of all freshman-graduate students in universities during 1977. No student can fit that description. Although the description of the empty set given above provides only trivial information, the empty set resulting from a set description in computer searching can be very informative, and its occurrence may be surprising or disappointing.

A set can also be described such that it has an infinite number of elements. Since all data bases on DIALOG are finite, such sets are of no practical consideration in this course.

A subset A of a set B is one such that every element of one set A is also an element of set B. For example, the set of seniors enrolled in universities in 1977 is a subset of the set of all students enrolled in universities in 1977.

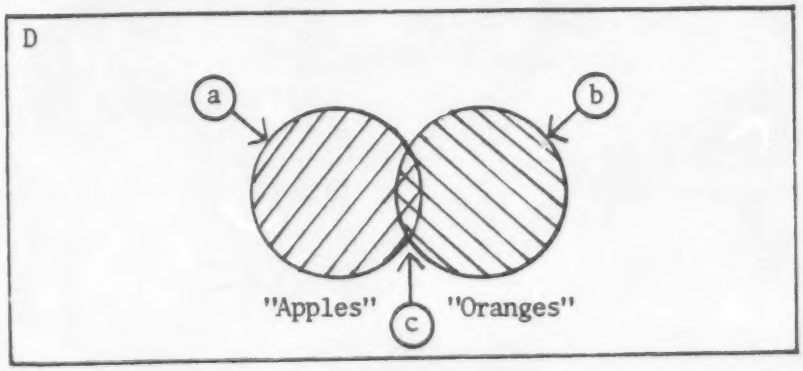
Sets can be related using "connectors" call logical operators. In the DIALOG language we will be studying, there are three logical operators: OR, AND, and NOT.

Although the names of these operators sound as if they were the familiar words of the English language, they do not have the flexivility of meaning we give them in everyday speech. In computer searching, they must be used with the restricted meaning given them by the search language--in this case the DIALOG language. Therefore, in formulating a computer search, English language variations in the meaning of "or", "and" and "not" must be explicitly transformed into the DIALOG language, using, if necessary, combinations of the logical operators, OR, AND, and NOT.

The meaning of OR, AND and NOT in the DIALOG language can be stated as follows:

1. OR relates two (or more) sets, say A and B, by specifying that the computer search of these sets must satisfy at least one of three conditions. The computer can report a match satisfying OR, if it finds indexing of a unit record by term A--or--if it finds indexing of a unit record by term B--or--if it finds indexing of a unit record by both terms A and B.

The logical relationship can be pictured using the term "apples" for term A and the term "oranges" for term B.

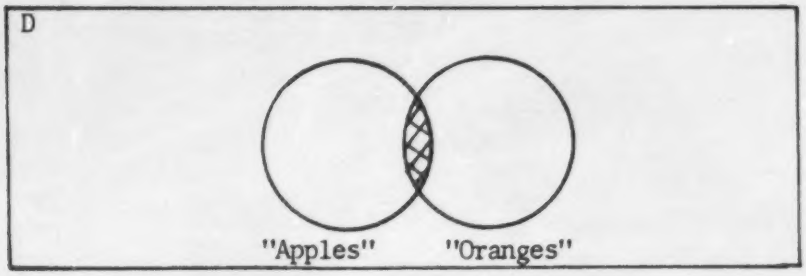


D=Database index terms

The rectangular region represents all index terms for a data base. Each disc represents a set, the elements of which are the terms named, respectively "apples", "oranges", repeated some finite number of times in unique association with each unit record they index. The shading indicates which set or subset satisfies OR.

Thus, if the computer finds indexing of unit records by the term "apples" shown by the circle labelled a--or-- if it finds indexing of unit records by the term "oranges" shown by the circle labelled b--or--if it finds unit records indexed by both terms, i.e., the intersect of the discs labelled c, then the computer reports that the set description is satisfied.

2. AND relates two sets of index terms, A and B, by requiring that the computer search its index of terms for unit records indexed by both A and B. Using the picture method, we have:

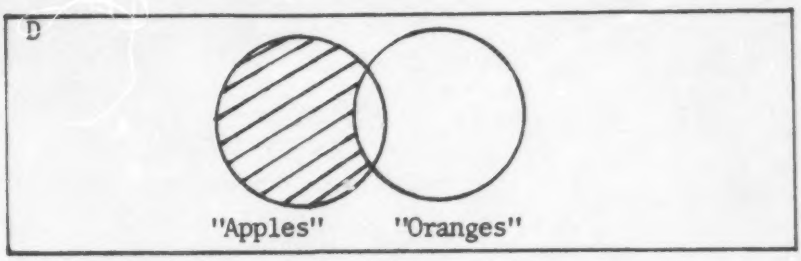


Note that the set "Apples" AND "Oranges" is a subset of "Apples" and a subset of "Oranges".

3. NOT relates A and B by specifying that the computer search its indexing terms for unit records to satisfy three conditions:

1) that there is indexing of a unit record for one term, say A, 2) that this unit record is not indexed for the other term, say B, and thus, 3) that the unit record is not indexed for A and B.

Using our diagram we see:



Here, the subset "Apples" AND "Oranges" is excluded, as is the set "Oranges".

Analyzing a Search Query

A search query is a set of search request statements expressing an information need. Since we are dealing with data bases containing unit records of publications, the information need is for unit records of publications about a subject or subjects.

The search request statements are normally expressed using our everyday natural language. Initially, they may be communicated very ambiguously. They may imply an information need far broader in scope than actually exists. They may imply a search for very specific information, when a more inclusive search is really intended.

Furthermore, they may use "or" or "and" in a way that is very different in meaning from the logical operators "OR" or "AND".* In general, then, the preparation for searching on computer requires careful examination of the real information need expressed, so that it can be "communicated" to the computer using the programming language designed for that communication.

With the background of this section and those preceding it, we pause here to apply what we have learned about sets and set logic to the execution of a search using some of the DIALOG system commands. Despite the additional information gained by learning some DIALOG commands, we will find that the results of the search are not very satisfactory. The reason for this is that the search plan (shown below) is deliberately formulated as a rapid, intuitive response to the search request statements expressed. The purpose in executing such a search is to illustrate the results which can occur when one becomes impatient with expressing the meaning of a search query in terms that exploit the capability of a search system. Much of the additional work lacking in this search formulation will be discussed in part II of our examination of computer searching using DIALOG.

Assume a search request statement expressed as follows:

"I am interested in the geological hazards of Santa Barbara. Specifically I would like to know about earthquakes in Santa Barbara, and, in particular, about the big earthquake which happened sometime in the "twenties."

A rapidly formulated, intuitive search plan to find unit records on this subject is as fullows:

```
    (1)              (2)
s earthquake;s earthquakes


     (3)
s Santa Barbara

    {4}
c (1 OR 2) AND 3
```

Note that the search plan numbers the indexing terms which will be used to find unit records so indexed. Observe also that the numbers of the terms selected, not the terms themselves, are associated with the logical operators. In addition, note how parentheses are used to express what will be OR-ed and AND-ed. DIALOG performs AND-ing of terms before OR-ing. If no parentheses were used, the program would interpret the set desired as anything indexed for "earthquake" OR anything indexed for both "earthquakes" AND "Santa Barbara"--a far different search than intended.

---

* For example, suppose a search request is for unit records of publications on apples and oranges. Since there is nothing that is both an apple and an orange, the search request must be interpreted as an information need for publications on apples, or publications on oranges, or publications concerned with both apples and oranges. Thus, the logical operator AND would be appropriate only if the search request implied a restriction to unit records indexed for both the terms "apples" and "oranges". Otherwise, OR would be appropriate.

The DIALOG system offers two alternative system commands for entering the terms and logic contained in the search plan above. They are called SuperSELECT commands.

Alternative A uses the SuperSELECT command ss. This command allows the searcher to enter the terms which will be searched and their logical relationships on the same line. A restatement of the search plan above, using the ss command, is as follows:

```
                (1)          (2)                  (3)
ss (earthquake or earthquakes) and Santa Barbara  {4}
```

The SuperSELECT ss command provides exactly the same information and control over the sets of index terms as the s and c commands used in the first search plan. The advantage of SuperSELECT ss over the s and c commands is that it normally requires less time to enter at the terminal and less response time from the DIALOG computers. When searching at commercial DIALOG rates ranging from $25 per connect hour to $90 per connect hour, the ss command can be a distinct advantage. The disadvantage of the ss command is that it requires careful search formatting and careful inputting at the terminal. Parentheses must be used for the same reasons mentioned under the first search plan. Note again the numbering of terms and logic.

Alternative B uses the SuperSELECT command s in combination with both terms and logic. The original search plan recast with the use of SuperSELECT s is as follows:

```
s (earthquake or earthquakes) and Santa Barbara {1}
```

All comments regarding alternative A apply to alternative B, with one important exception. Use of the SuperSELECT s command provides control only over the final results of the search statement. Information is provided by the DIALOG system on the number of unit records indexed by each term, but the set of indexed unit records which can be used later for sampling online or printing offline is limited to the final set only.

In general, this course will use the search commands illustrated in the first search script of Alternative A. Either approach allows the user to maintain easy control over the set of unit records produced by each term and each logical combination of terms.

We now consider in detail the steps needed to enter the planned search and its alternatives on the DIALOG system. We shall consider, later, the steps necessary to avoid the resultant empty set of this search.

First Annotated Sample Search Record: Geological Hazards of Santa Barbara

[1] [2]

```
? b58
```

[1] The question mark at the beginning of a line is the prompt from DIALOG signaling readiness for the searcher to enter a command to the search system.

[2] "b" is the abbreviation for the BEGIN command. This command, followed by the DIALOG assigned number for the data base to be searched (and a carriage return), requests connection to the specified data base--in this case GEOARCHIVE.

[3]

```
        4sep79 16:37:56 User8533
  *0.35  0.005 Hrs File58  [a]
  *0.03  Telenet                                  [3]
[b]*0.38  Estimated Total Cost
File58:GEOARCHIVE 74-79/FEB [c]
(Copr. GEOSYSTEMS)
      [d] Set  Items Description (+=OR;*=AND;-=NOT)
          ---  ----- -----------------------------------
```

[3] DIALOG response to "b58" indicates: [a] time search starts, [b] charges from time DIALOG password is entered to the start of BEGIN command, [c] confirmation of data base requested and the time-span of the entry of unit records into the data base, and [d] the headings for columns of search results.

[5]

```
[4] ? s earthquake; s earthquakes [6]
      [7]→ 1   4903 EARTHQUAKE
           2   2393 EARTHQUAKES
? s santa barbara
           3      0 SANTA BARBARA
[8] ? c (1 or 2) and 3
           4      0 (1 OR 2) AND 3
```

[4] The SELECT command, abbreviated s, requesting DIALOG to establish a set described by the term following "s", then, to count and report the number of unit records indexed by the ter

[5] The semicolon indicates to DIALOG the end of one set description and the beginning of another set description. This "stacking" option can be used, when convenient, and a faster response from DIALOG is desirable.

[6] After the set or sets have been described the carriage return key is pressed to signal DIALOG to respond to the SELECT commands.

[7] DIALOG response to the SELECT commands, indicating: a) the number assigned to the set SELECT-ed, b) the number of unit records (or items) indexed (or posted) by the term specified in the set description, and, c) the term communicated to the computer (providing a check on the message transmitted and a record for further reference as the search proceeds.)

[8] The COMBINE command, abbreviated c, which, with the Boolean operators specifies how the previously SELECT-ed sets are to be logically related. Only the numbers assigned the sets can be used with the COMBINE command. Parentheses indicate that set 2 is OR-ed with set 1.

Alternative A: Use of SuperSELECT command ss

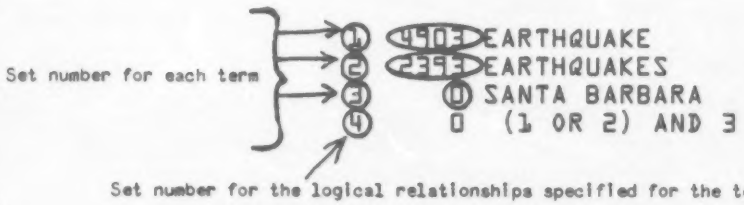
```
? b58

          4sep79 16:39:52 User8533
  $1.19  0.017 Hrs File58 2 Descriptors
  $0.09  Telenet
  $1.28  Estimated Total Cost
File58:GEOARCHIVE 74-79/FEB
(Copr. GEOSYSTEMS)
          Set Items Description (+=OR;*=AND;-=NOT)

? ss (earthquake or earthquakes) and santa barbara
```

(1)

Number of unit records indexed for each term



Set number for the logical relationships specified for the terms.

(1) The SuperSELECT SELECT STEPS Command, abbreviated ss, requesting DIALOG to assign a set number to the number of unit records indexed for each term, and to the set resulting from the application of the logical relationships to the terms. The ss command allows the searcher to reuse the sets established for each term by referring to the set number assigned to each term. Two methods are available for the reuse of numbered sets. The first method uses the COMBINE command, c, the previously established number of the sets, and the appropriate logical operators. The second method uses the ss command, inserts s before each set number, and the required logical operators.

Alternative B: Use of SuperSELECT command s

```
? b58

         4sep79 16:40:36 User8533
  $0.98  0.014 Hrs File58 2 Descriptors
  $0.07  Telenet
  $1.05  Estimated Total Cost
File58:GEOARCHIVE 74-79/FEB
(Copr. GEOSYSTEMS)
         Set Items Description (+=OR;*=AND;-=NOT)

? (s) (earthquake or earthquakes) and santa barbara
  (1)
```

(1) The SuperSELECT SELECT command, abbreviated s, requesting DIALOG to assign a set number for only those unit records which satisfy the logic specified for the terms. Sets for the individual terms can be used only by individually re-SELECT-ing the terms using the commands illustrated in the first example or by using the ss command.

No set numbers established for individual terms.

```
      4903 EARTHQUAKE
      2393 EARTHQUAKES
         (D) SANTA BARBARA
  1   D   (EARTHQUAKE OR EARTHQUAKES) AND SANTA BARBARA
? logoff hold

         4sep79 16:41:24 User8533
  $1.05  0.015 Hrs File58 2 Descriptors
  $0.08  Telenet
  $1.13  Estimated Total Cost

LOGOFF 16:41:29
```

91

BASIC TECHNIQUES OF SEARCHING USING LOCKHEED'S DIALOG SYSTEM: PART I
EXERCISES

Purposes: To review set logic and the DIALOG commands: SELECT, COMBINE and SuperSELECT STEPS

30 points 1. a) A search plan is displayed below. The information need is: "Redwood and Pine Forests in California." The search requestor is studying both redwood forests, and pine forests as well as mixed stands of redwoods or pines. Although the search plan, below, includes only a few of the needed terms for an actual search, it also includes a number of errors in the use of the SELECT and COMBINE commands. Circle these errors.

```
     (1)                    (2)
s redwood or redwcods;  s pine or pines

          (3)
c 1 and 2 and forest or forests

     (4)
s California

     (5)
c 3 and 4
```

b) Now write two correctly formatted search plans using only the terms given in the original search. Use the left hand column for a search plan formatted with the SELECT and COMBINE commands. Use the right hand column for a search plan formatted with the SuperSELECT STEPS command

Search Plan Using SELECT and COMBINE	Search Plan Using SuperSELECT STEPS

30 points 2. You are interested in a broad computer search of the literature on lemon orchards. In previous research on tangerine orchards, you have found a number of publications concerned with both tangerines and lemons. You want these eliminated in the computer generated bibliography resulting from the search. Complete the simplified search plan below, so as to satisfy the logical requirements of the search.

```
    (1)          (2)          (3)          (4)
s orchard;  s orchards;  s grove;  s groves

          {5}
c 1 or 2 or 3 or 4

     (6)          (7)
s tangerine;  s tangerines

   (8)
c 6 or 7

   (9)        (10)
s lemon;  s lemons

   {11}
c 9 or 10
```

40 points 3. A researcher is interested in the use of diatomaceous earth or diatomite in relation to insecticides. He wants to review any publications on the subject.

a) Read over the terms listed below for a simplified search on the information need indicated above. Format the search using the SuperSELECT STEPS command and each term listed. Plan the search so that all terms are entered in one line. Remember that parentheses are used to indicate a required order of logical operations.

diatomaceous; earth; diatomite; pesticide; pesticides; insecticide; insecticides

b) Later during the actual search, the searcher discovers that the related term, silica, should have been intersected with the pesticide and insecticide terms. Write the COMBINE command the searcher would use to add "silica" to the search.

c) The searcher then decides to create one set COMBINE-ing the set resulting from the SuperSELECT STEPS command and the COMBINE command. Should the searcher use the logical "AND"? Provide a brief explanation for your answer.

BASIC TECHNIQUES OF COMPUTER SEARCHING USING LOCKHEED'S DIALOG SYSTEM

PART II

Annotated, Revised Search Plan

A. Information need: Publications of all types on geological hazards affecting all parts of Santa Barbara County and the Santa Barbara Channel. Particular emphasis is to be given to literature on historical or potential earthquakes in these areas. Date and language of publication are not limited.

{Note that publication type, geographic area, emphasis of search, date and language of publication are now specified. Explicit decisions, such as those just mentioned, must be made before beginning work on facetting and the search plan.}

B. Databases to be used: File 6, NTIS; File 58, GEOARCHIVE; File 28, OCEANIC

{The explicit information need is matched against available databases which are most likely to produce a significant number of bibliographic records satisfying the need. The structure of the databases and their treatment by DIALOG are next examined. The structures of the databases are detailed in various user aids published by the database producers. Selected user aids are listed in the DIALOG Information Retrieval Service's Search Aids for Use with DIALOG Databases. DIALOG's treatment of the databases, including the fields of the basic index and other searchable fields, can be found in Guide to DIALOG Data Bases.}

C. Facets (concept groups)

1. AND-ed 2.

Santa Barbara Facet (OR-ed)	Geological Hazards Facet (OR-ed)
Santa Barbara County	earthquake;earthquakes
Santa Barbara City	foreshock; foreshocks
Santa Maria, California	aftershock; aftershocks
Solvang, California	earth movement; earth movements
{List of other cities of Santa Barbara County}	epicenter; epicentre; epicenters; epicentres
Santa Cruz Island, California	microearthquake; microearthquakes
Santa Rosa Island, California	earthquake; earthquakes
{List of other islands of Santa Barbara County}	seism; seisms; seismic; seismology; seismological
Channel Islands, California	isoseism; isoseisms; isoseismic
Santa Barbara Channel	fault; faults; faulting; faulted
Transverse Ranges	mass movement; mass movements

Facets (concept groups) (continued)

AND-ed

1. Santa Barbara Facet (OR-ed)	2. Geological Hazards (OR-ed)
Santa Ynez Mountains	erosion; erosional
{List of other physiographic features of Santa Barbara County}	creep; creeping
Southern California	slump; slumps; slumped; slumping
California	thixotropic
Western United States	liquifaction
North Eastern Pacific Ocean	mudslide; mudslides
{List of other, broader geographic terms}	landslide; landslides
	rockfall; rockfalls
	rockslide; rockslides
	land subsidence
	debris flow; debris flows
	debris avalanche; debris avalanches
	mass wasting
	gullying
	tsunami; tsunamis
	tidal wave; tidal waves
	geological hazard; geological hazards
	environmental geology
	engineering geology
	{List of other, broader geological topics}

{Note the listing of terms in their various grammatical forms. Note also consideration of variant spellings of terms, synonyms or closely related terms, and broader or narrower terms from hierarchies. Even though all the terms listed might provide relevant unit records as part of the search strategy, it is seldom cost-effective to input so lengthy a search. The emphasis of the search mandates a number of "earthquake" terms. The remainder concentrates on terms from the thesauri of the database producers (listed in user aids cited above) and broad terms. The mix of thesauri terms, grammatical and synonymous terms likely to occur in the titles of unit records, etc. is essentially judgmental <u>but</u> is always based on the parameters specified in the information need.}

D. Search Strategy

B6 *{Terms and logic are entered on the least expensive database; hourly connect time charges are 6 ($35); 58 ($70); 28 ($75)}*

(1) s santa(w)barbara/ti,de,ed	*{Full text search is used; the (w), word adjacency, operator is limited to titles, descriptors and identifiers to avoid irrelevant citations resulting from the fact that "Santa Barbara" may occur as a corporate source term in the basic index of file 6. Word adjacency is used to search titles as well as assigned subjects, since "Santa Barbara" is not a descriptor in GEOARCHIVE, file 58, (as shown by its thesaurus). Because DIALOG indexes each word in the basic index, "santa(w)barbara"*

Search Strategy (continued)

will establish a set indexed for Santa Barbara County, Santa Barbara Channel as well as Santa Barbara and Santa Barbara, California. The SELECT command is used rather than SuperSELECT to avoid complex, time consuming use of parentheses in entering the longer "geological hazards" facet.}

```
      (2)              (3)                (4)       (5)          (6)
ss earthquake? or earth(w)movement? or seism? or fault??? ? or erosion?   {7}
```

{SuperSELECT SELECT STEPS is used to enter the first six terms from the "geological hazards" facet. Term selection principles used for this facet were: a) to use all available major search terms for the earthquake emphasis of this search; b) to use only relevant controlled vocabulary from medium to general levels of hierarchies displayed in the thesauri of all three files, and c) to make heavy use of truncation, after careful checking in dictionaries to avoid terms which might result in false drops. Note the use of limited and unlimited trancation, e.g., fault??? ?, earthquake?, geologi?(w)hazard?}

```
     (8)          (9)          (10)                          (11)
ss landslide? or tsunami? or tidal(w)wave? or engineering(w)geology  {12}
```

{Input of the "geological hazards" facet continues. Although the entire "geological hazards" facet might be entered after one ss command, DIALOG line length limitations, typing error probabilities and other considerations suggest limiting each ss command to a maximum of six or seven terms for input.}

```
       (13)                  (14)
ss geologi?(w)hazard? or environmental(w)geology  {15}
```

{Entry of the concluding terms of the "geologic hazards" facet.}

```
     {16}
c 1 and (7or12or15)
```

{The COMBINE command is used to intersect the "Santa Barbara" facet with the OR-ed ss logic of the "geologic hazards" facet.}

t16/8/1-5

{Set 16 is sampled for title and descriptor terms. Format 8 is used, since it provides the most economical way to test for relevant unit records captured by the search strategy.}

pr16/5/1-

{The PRINT command uses format 5, the complete unit record, for offline printing. If the set resulting from the search is small, (i.e., no larger than 15-17), an online printing option format may be used. Format 3 provides all essential bibliographic information, but no abstract. The size of the set chosen for online printing can be significantly larger, if a fast-printing terminal is used.}

end/savetemp

{The search strategy was designed for searching on more than one database. The command "END/SAVETEMP" instructs DIALOG to save the search strategy for one day for use on other databases. A coded name beginning with the letter "t" is assigned by DIALOG to the saved search strategy.}

B58

{The database GEOARCHIVE is chosen for searching.}

.execute steps t_ _ _

{This command, or its abbreviation, exs. t_ _ _, requires DIALOG to recall the search strategy saved on file 6, NTIS, and to execute each step using, this time, the indexed terms of file 58, GEOARCHIVE. Each term and all logic is available for further manipulation on the new database, if the original search strategy is unsatisfactory or requires improvements.}

t16/8/1-5

{The results of the .EXECUTE-d search strategy are sampled for relevance or possible term or logic changes.}

pr16/5/1-

{An offline print of the full unit records is planned.}

B28

{The next database, 53, OCEANIC is chosen.}

.execute steps t_ _ _

t16/8/1-5

pr16/5/1-

Logoff hold

{The search session is planned for termination at this point.}

E. Backup search strategy

1. Broadening the search
   Accept all records from "Santa Barbara" facet or - use all specific terms of "Santa Barbara" facet AND-ed with all terms of "geological hazards" facet.

2. Narrowing the search
   Eliminate: "environmental(w)geology", "engineering(w)geology" and "geological(w)hazards" from facet.

Information Need: Geological Hazards of Santa Barbara

(For full statement of information need, see Annotated, Revised Search Plan, Part A)

Search Record

```
TELENET
213 51

TERMINAL=decw

@c 415 20


415 20 CONNECTED


ENTER YOUR DIALOG PASSWORD
KKKKKKKK
WWWWWWWW  LOGON File1 Fri 21sep79 10:57:17 Port089

? bb

        21sep79 10:57:40 User8533
  $0.20  0.008 Hrs File1*
  $0.04  Telenet
  $0.24  Estimated Total Cost
File6:NTIS 64-79/ISS20
(Copr. NTIS)
        Set Items Description (+=OR;*=AND;-=NOT)
        --- ----- ------------------------------
?(s)santa(w)barbara/ti,de,id
          1     43 SANTA(W)BARBARA/TI,DE,ID
? (ss)earthquake? or earth(w)movement? or seism? or fault??? ? or erosion?
          2   3485 EARTHQUAKE?
          3    387 EARTH(W)MOVEMENT
          4   6217 SEISM?
          5   2317 FAULT??? ?
          6   3605 EROSION?
          7  12426  2 OR 3 OR 4 OR 5 OR 6
? (ss) landslide? or tsunami? or tidal(w)wave? or engineering(w)geology
          8    118 LANDSLIDE?
          9    181 TSUNAMI?
         10     14 TIDAL(W)WAVE?
         11    270 ENGINEERING(W)GEOLOGY
         12    564  8 OR 9 OR 10 OR 11
? ss geologi?(w)hazard? or environmental(w)geology
         13      6 GEOLOGI?(W)HAZARD?
         14      7 ENVIRONMENTAL(W)GEOLOGY
         15     13  13 OR 14
?(c)1 and (7 or 12 or 15)
         16      8  1 AND (7 OR 12 OR 15)
```

? t16/8/1-5

16/8/1
PB-295 058/2ST NTIS Prices: PC A07/MF A01

Engineering Features of the Santa Barbara Earthquake of August 13, 1978

Descriptors: *Earthquakes, *Damage assessment, Earth movements, Earthquake resistant structures, Buildings, Utilities, Transportation, Soil dynamics, Seismic waves, California

Identifiers: Earthquake engineering, *Ground motion, Santa Barbara(California), NTISNSFRA

16/8/2
PB-283 187/3ST NTIS Prices: PC A13/MF A01

Geotechnical and Strong Motion Earthquake Data from U.S. Accelerograph Stations, Pasadena (CIT Millikan Library), Santa Barbara County Court House, Taft (Lincoln School Tunnel) and Hollister (Melendy Ranch Barn), California. Volume II

Descriptors: *Earthquakes, *Soils, *Subsurface investigations, Earth movements, Sands, Silts, Siltstones, Geological faults, Seismographs, California

Identifiers: Pasadena(California), Taft(California), Hollister(California), Santa Barbara(California), *Earthquake engineering, *Ground motion, NTISNUREG

16/8/3
PB-279 064/0ST NTIS Prices: PC A99/MF A01

Proposed 1975 Outer Continental Shelf Oil and Gas General Lease Sale Offshore Southern California, OCS Sale Number 35. Volume 4

Descriptors: *Offshore operations, *Continental shelves, *Petroleum, *Crude oil, *Natural gas, *Environmental impact statements - final, Environmental impacts, Air pollution, Oil pollution, Water pollution, Leasing, Exploration, Energy source development, California, Santa Rosa-Cortes North Region, Santa Monica Bay, Santa Barbara Island, Geology, Oceanography, Earthquakes, Economic development, Ecology, Regulations

Identifiers: NTISDIBLM

16/8/4
AD-A042 473/9ST NTIS Prices: PC A02/MF A01

Longshore Transport at a Total Littoral Barrier

Descriptors: *Sediment transport, *Littoral drift, *Santa Barbara Islands, *Beach erosion, Beaches, Ocean waves, California, Reprints

Identifiers: Channels Island Harbor, NTISDODXR

16/8/5
PB-237 739/8ST NTIS Prices: PC A03/MF A01

Application of ERTS Images to Study of Active and Potentially Active Faults, Santa Barbara Area, California

Descriptors: *Urban planning, *Geologic faults, *Remote sensing, Spaceborne photography, Photointerpretation, Construction benefits, Safety, Classifications, California

Identifiers: Santa Barbara County(California), ERTS-1 satellite, *Earthquake engineering, Seismic safety, Seismic activity, NTISDIUSGS

? s ground(w)motion?

17 982 GROUND(W)MOTION

? c 1 and (7 or 12 or 15 or 17)

18 8 1 AND (7 OR 12 OR 15 OR 17)

? t18/3/1-8

{The term "ground motion" in records 1 and 2 above, is relevant, and was not included in the emphasized earthquake terms of the "geologic hazards" facet. Therefore, the planned search is ammended by SELECT-ing the term and inserting it in the logic of the search.}

18/3/1
F1484K1 PB-295 058/2ST
Engineering Features of the Santa Barbara Earthquake of August 13, 1978
Miller, Richard K.; Felszeghy, Stephen F.
California Univ., Santa Barbara. Dept. of Mechanical and Environmental Engineering.*National Science Foundation, Washington, DC. Applied Science and Research Applications.
Dec 78 136p
Rept No: UCSB-ME-78-2

18/3/2
F0062F1 PB-283 187/3ST
Geotechnical and Strong Motion Earthquake Data from U.S. Accelerograph Stations, Pasadena (CIT Millikan Library), Santa Barbara County Court House, Taft (Lincoln School Tunnel) and Hollister (Melendy Ranch Barn), California. Volume II; Contractor rept.
Shannon and Wilson, Inc./Agbabian Associates, Seattle, WA.*Nuclear Regulatory Commission, Washington, DC. Div. of Reactor Safety Research.
Jun 78 295p
See also Volume 1, PB-257 234

18/3/3
E1361E2 PB-279 064/0ST
Proposed 1975 Outer Continental Shelf Oil and Gas General Lease Sale Offshore Southern California. OCS Sale Number 35. Volume 4; Final environmental statement.
Bureau of Land Management, Washington, D.C.
Rept No: BLM-ME-78-20
Also available in set of 4 reports PC E99, PB-279 060-SET
See also Volume 3, PB-279 063.

18/3/4
D3212D1 AD-A042 473/9ST
Longshore Transport at a Total Littoral Barrier
Bruno, Richard O.; Gable, Christopher G.
Coastal Engineering Research Center Fort Belvoir Va
1976 22p
Rept No: CERC-Reprint-77-6
Availability: Pub. in Proceedings of the Coastal Engineering Conference (15th), Honolulu, Hawaii, 11-17 Jul 76, Ch71 p1203-1222 1976

18/3/5
C3993G1 PB-237 739/8ST
Application of ERTS Images to Study of Active and Potentially Active Faults, Santa Barbara Area, California; Final rept.
Lamar, D. L.; Merifield, P. M.
California Earth Science Corp., Santa Monica.*Geological Survey, Menlo Park, Calif.
Sep 74 38p
Rept No: TR-74-3

18/3/6
C2454L4 COM-74-10318/5
Microbial Decomposition Patterns Using Crude Oil
Mechalas, B. J.; Meyers, T. J.; Kolpack, R. L.
University of Southern California, Los Angeles. Environmental Geology Program.
1973 15p
Also included in Microbial Degradation of Oil Pollutants, Rept. no. LSU -SG-73-01, AD-760 716.

18/3/7
7315C4 AD-700 674
BULLETIN. VOLUME 6, NUMBER 1
Roll, Hans Ulrich; Neumann, Gerhard
Corps of Engineers Washington D C Beach Erosion Board
1 Jan52 40p
Errata sheet included. See also Volume 5, No. 4, AD-700 673 and Volume 6, No. 2, AD-700 675.

18/3/8
7184A2 AD-699 404
SOURCE OF BEACH SAND AT SANTA BARBARA, CALIFORNIA, AS INDICATED BY MINERAL GRAIN STUDIES; Technical memo.
Trask, Parker D.
Corps of Engineers Washington D C Beach Erosion Board
Oct 52 27p
Rept No: TM-28

?end/savetemp

96

```
Serial#T1X9
        21sep79 11:06:33 User8533
  $5.25  0.150 Hrs File6 20 Descriptors
  $0.75  Telenet
  $6.00  Estimated Total Cost
? b58

        21sep79 11:06:44 User8533
  $0.14  0.004 Hrs File6
  $0.02  Telenet
  $0.16  Estimated Total Cost
File58:GEOARCHIVE 74-79/MAR
(Copr. GEOSYSTEMS)
        Set Items Description (+=OR;*=AND;-=NOT)

? .execute steps1x9

          1    89 SANTA(W)BARBARA/TI,DE,ID
          2  6049 EARTHQUAKE?
          3    10 EARTH(W)MOVEMENT?
          4  7119 SEISM?
          5  2623 FAULT??? ?
          6  1414 EROSION?
          7 14424  2 OR 3 OR 4 OR 5 OR 6
          8   545 LANDSLIDE?
          9    82 TSUNAMI?
         10    13 TIDAL(W)WAVE?
         11  1116 ENGINEERING(W)GEOLOGY
         12  1739  8 OR 9 OR 10 OR 11
         13   801 GEOLOGY?(W)HAZARD?
         14  2244 ENVIRONMENTAL(W)GEOLOGY
         15  3016  13 OR 14
         16    27  1 AND  7 OR 12 OR 15
         17   111 GROUND(W)MOTION
         18    27  1 AND  7 OR 12 OR 15 OR 17
? t18/8/1-5

18/8/1
GA453000869   0537979
  On the magnitude of the August 13, 1978,  Santa Barbara,  California
ea rthquake
  DESCRIPTORS: EARTHQUAKE INTENSITY
  AUXILIARY DESCRIPTORS: CALIFORNIA
  DESCRIPTOR CODES: 682700
  AUXILIARY DESCRIPTOR CODES: 796300

18/8/2
GA453000847   0537957
  Aftershock  study of the August 13,  1978 Santa Barbara,  California
ear thquake
  DESCRIPTORS: EARTHQUAKE MONITORING; EARTHQUAKE HISTORY
  AUXILIARY DESCRIPTORS: CALIFORNIA
  DESCRIPTOR CODES: 682300; 682100
  AUXILIARY DESCRIPTOR CODES: 796300
```

```
18/8/3
GA453000845   0537955
  The 1978 Santa Barbara earthquake as recorded by an offshore seismic
network
  DESCRIPTORS: EARTHQUAKE MONITORING
  AUXILIARY DESCRIPTORS: CALIFORNIA; CONTINENTAL SHELF, OFFSHORE
  DESCRIPTOR CODES: 682300
  AUXILIARY DESCRIPTOR CODES: 796300; 007000

18/8/4
GA453000835   0537945
  Sonobuoy measurements of aftershocks of Santa Barbara 13 August 1978
earthquake
  DESCRIPTORS: EARTHQUAKE DISTRIBUTION
  AUXILIARY DESCRIPTORS: CALIFORNIA; CAOSTAL AREAS
  DESCRIPTOR CODES: 682200
  AUXILIARY DESCRIPTOR CODES: 796300; 006000

18/8/5
GA453000831   0537941
  The Santa Barbara Channel earthquake of August 13, 1978
  DESCRIPTORS: EARTHQUAKE HISTORY; EARTHQUAKE FOCI & EPICENTRES
  AUXILIARY DESCRIPTORS: CALIFORNIA
  DESCRIPTOR CODES: 682100; 682500
  AUXILIARY DESCRIPTOR CODES: 796300
? pr18/5/1-27

        21sep79 11:10:05 User
  $3.99  0.057 Hrs File58 20 Descriptors
  $0.29  Telenet
  $4.28  Estimated Total Cost
File28:OCEANIC ABS 64-77
(COPR. DATA COURIER, INC.)
        Set Items Description (+=OR;*=AND;-=NOT)
        --- ----- ------------------------------
? .execute stepst1x9

          1   270 SANTA(W)BARBARA/TI,DE,ID
          2   320 EARTHQUAKE?
          3     4 EARTH(W)MOVEMENT
          4  1375 SEISM?
          5   247 FAULT??? ?
          6   463 EROSION?
          7  2202  2 OR 3 OR 4 OR 5 OR 6
          8     7 LANDSLIDE?
          9   249 TSUNAMI?
         10    51 TIDAL(W)WAVE?
         11     2 ENGINEERING(W)GEOLOGY
         12   303  8 OR 9 OR 10 OR 11
         13     1 GEOLOGI?(W)HAZARD?
         14     1 ENVIRONMENTAL(W)GEOLOGY
         15     2  13 OR 14
         16    14  1 AND (7 OR 12 OR 15)
         17     2 GROUND(W)MOTION?
         18    14  1 AND (7 OR 12 OR 15 OR 17)
? t18/8/1-5
```

93

18/8/1
77-05501
OFFSHORE GEOLOGY AND SEDIMENT DISTRIBUTION OF THE EL CAPITAN-GAVIOTA CONTINENTAL SHELF, NORTHERN SANTA BARBARA CHANNEL, CALIFORNIA.
Descriptors: PALEOTOPOGRAPHY; SEDIMENT DISTRIBUTION; CONTINENTAL SHELVES; QUATERNARY; STRATA; CRETACEOUS; TOPOGRAPHY; SEDIMENTS; GEOLOGY; SANTA BARBARA CHANNEL; CALIFORNIA COAST; GEOMORPHOLOGY; TERTIARY; FAULT ZONES; TECTONICS; SEISMIC SURVEYS; CORE SAMPLES

18/8/2
72-60445
NEW SEISMIC TOOLS LED TO SANTA YNEZ OIL.
Descriptors: SEISMIC SURVEYS; OFFSHORE EXPLORATION; SANTA BARBARA CHANNEL

18/8/3
72-21960
SEISMICITY AND SEISMIC HAZARDS OF THE SANTA BARBARA CHANNEL REGION, CALIFORNIA.
Descriptors: SEISMICITY; SANTA BARBARA CHANNEL; MONITORING STUDIES; ABSTRACT ONLY

18/8/4
72-20719
EXPLORATION HISTORY OF THE SANTA BARBARA CHANNEL
Descriptors: SANTA BARBARA CHANNEL; SEISMIC SURVEYS; OFFSHORE EXPLORATION; ABSTRACT ONLY

18/8/5
71-60194
GEOLOGY, PETROLEUM DEVELOPMENT, AND SEISMICITY OF THE SANTA BARBARA CHANNEL REGION, CALIFORNIA. GEOLOGIC CHARACTERISTICS OF THE DOS CUADRAS OFFSHORE OIL FIELD.
Descriptors: SANTA BARBARA CHANNEL; LITHOLOGY; OFFSHORE OPERATIONS; GEOLOGICAL CHARACTERISTICS; DOS CUADRAS OIL FIELD; OIL EXPLORATION; STRATIGRAPHY

? t18/3/1-14

18/3/1
77-05501
OFFSHORE GEOLOGY AND SEDIMENT DISTRIBUTION OF THE EL CAPITAN-GAVIOTA CONTINENTAL SHELF, NORTHERN SANTA BARBARA CHANNEL, CALIFORNIA.
ASHLEY, R.J.; FISCHER, P.J.; BERRY, R.W.
INTERSEA RESEARCH CORP., 11760 SORRENTO VALLEY RD., SAN; DIEGO, CA 92121
JOURNAL OF SEDIMENTARY PETROLOGY, 47(1): 199-208, MAR. 1977. Publ.Yr: 77

18/3/2
72-60445
NEW SEISMIC TOOLS LED TO SANTA YNEZ OIL
WILSON, HOWARD M.
OIL AND GAS JOURNAL, 70(26): 116-117, JUNE 26, 1972. Publ.Yr: 72

18/3/3
72-21960
SEISMICITY AND SEISMIC HAZARDS OF THE SANTA BARBARA CHANNEL REGION, CALIFORNIA.
SYLVESTER, A. G.
SEE CITATION NO. M2-68 1877 P. 234. SEPT. 1971. Publ.Yr: 71

18/3/4
72-20719
EXPLORATION HISTORY OF THE SANTA BARBARA CHANNEL.
SCHULTZ, F. E.
SEE CITATION NO. 72-28-0718 PP. 61-62. 1971. Publ.Yr: 71

18/3/5
71-60194
GEOLOGY, PETROLEUM DEVELOPMENT, AND SEISMICITY OF THE SANTA BARBARA CHANNEL REGION, CALIFORNIA. GEOLOGIC CHARACTERISTICS OF THE DOS CUADRAS OFFSHORE OIL FIELD.
MCCULLOH, T. H.
U.S. GEOLOGICAL SURVEY. WASH., D.C. PROFESSIONAL PAPER NO. 679-C, 20 PAGES, 1969. Publ.Yr: 69

18/3/6
71-60193
GEOLOGY, PETROLEUM DEVELOPMENT, AND SEISMICITY OF THE SANTA BARBARA CHANNEL REGION, CALIFORNIA. PETROLEUM DEVELOPMENT IN THE REGION OF THE SANTA BARBARA CHANNEL.
YERKES, Y. F.; WAGNER, H. C.; YENNE, K. A.
U.S. GEOLOGICAL SURVEY. WASH., D.C. PROFESSIONAL PAPER NO. 679-B, 17 PAGES, 1969. Publ.Yr: 69

18/3/7
71-20854
ACCUMULATION OF TECTONIC STRAIN IN CALIFORNIA.
BURFORD, R. O.
SEISMOLOGICAL SOCIETY OF AMERICA. BULLETIN, 60(6): 1877-1896, DEC. 1970. Publ.Yr: 70

18/3/8
71-20782
GEOLOGY, PETROLEUM DEVELOPMENT, AND SEISMICITY OF THE SANTA BARBARA CHANNEL REGION, CALIFORNIA. SEISMICITY AND ASSOCIATED EFFECTS, SANTA BARBARA REGION.
HAMILTON, R. M.; YERKES, R. F.; BROWN, R. D., JR.; BURFORD, R. O.; DENOYER, J. M.
U.S. GEOLOGICAL SURVEY. WASH., D.C. PROFESSIONAL PAPER NO. 679-D, 33 PAGES, 1969. Publ.Yr: 69

18/3/9
71-20781
GEOLOGY, PETROLEUM DEVELOPMENT, AND SEISMICITY OF THE SANTA BARBARA CHANNEL REGION, CALIFORNIA. GEOLOGIC FRAMEWORK OF THE SANTA BARBARA CHANNEL REGION.
VEDDER, J. G.; WAGNER, H. C.; SCHOELLHAMER, J. E.
U.S. GEOLOGICAL SURVEY. WASH., D.C. PROFESSIONAL PAPER NO. 679-A, 13 PAGES, 1969. Publ.Yr: 69

18/3/10
71-20245
EARTHQUAKE SWARM IN THE SANTA BARBARA CHANNEL, CALIFORNIA, 1968.
SYLVESTER, ARTHUR G.; SMITH, STEWART W.; SCHOLZ, C. H.
SEISMOLOGICAL SOCIETY OF AMERICA. BULLETIN, 60(4) :1047-1060, AUG. 1970. Publ.Yr: 70

18/3/11
70-00369
GEOLOGY, PETROLEUM DEVELOPMENT, AND SEISMICITY OF THE SANTA BARBARA CHANNEL REGION, CALIFORNIA. D. SEISMICITY AND ASSOCIATED EFFECTS, SANTA BARBARA REGION.
HAMILTON, R. M.; YERKES, R. F.; BROWN, R. D., JR.; BURFORD, R. O.; DENOYER, J. M.
U.S. GEOLOGICAL SURVEY. WASH., D.C. PROFESSIONAL PAPER NO. 679-D, 47-77, 1969. Publ.Yr: 69

18/3/12
70-00368
GEOLOGY, PETROLEUM DEVELOPMENT, AND SEISMICITY OF THE SANTA BARBARA CHANNEL REGION, CALIFORNIA. C. GEOLOGIC CHARACTERISTICS OF THE DOS CUADRAS OFFSHORE OIL FIELD.
MCCULLOH, T. H.
U.S. GEOLOGICAL SURVEY. WASH., D.C. PROFESSIONAL PAPER NO. 679-C, 29-46, 69-77, 1969. Publ.Yr: 69

18/3/13
70-00367
GEOLOGY, PETROLEUM DEVELOPMENT, AND SEISMICITY OF THE SANTA BARBARA CHANNEL REGION, CALIFORNIA. B. PETROLEUM
YERKES, R. F.; WAGNER, H. C.; YENNED, K. A.
U.S. GEOLOGICAL SURVEY. WASH., D.C. PROFESSIONAL PAPER NO. 679-B, 13-27, 69-77, 1969. DEVELOPMENT IN THE REGION OF THE SANTA BARBARA CHANNEL. Publ.Yr: 69

18/3/14
70-00366
GEOLOGY, PETROLEUM DEVELOPMENT, AND SEISMICITY OF THE SANTA BARBARA CHANNEL REGION, CALIFORNIA. A. GEOLOGIC FRAMEWORK OF THE SANTA BARBARA CHANNEL REGION.
VEDDER, J. G.; WAGNER, H. C.; SCHOELHAMER, J. E.
U.S. GEOLOGICAL SURVEY. WASH., D.C. PROFESSIONAL PAPER NO. 679-A, 1-13, 69-77, 1969. Publ.Yr: 69

? logoff hold

21sep79 11:15:01 User8533
$6.30 0.084 Hrs File28 20 Descriptors
$0.42 Telenet
$6.72 Estimated Total Cost

LOGOFF 11:15:05

415 20 DISCONNECTED 0:18:4 244 24

@

BASIC TECHNIQUES OF COMPUTER SEARCHING USING LOCKHEED'S DIALOG SYSTEM: PART II

EXERCISE

Purpose: To review DIALOG commands and search plan writing

You have saved a search strategy on DIALOG. The search system has labelled it: T004. The strategy of T004 was to capture unit records on computer or manual data processing and retrieval as applied to certain types of geographic information. You now plan to construct a high recall search strategy on computer or manual data processing and data retrieval as well as mathematical modelling when they are applied to the study of periodic changes in ecosystems. You will perform the search on file 358. File 358 contains title, descriptor and abstract terms in the basic index. Descriptor terms are weighted, and the command L (set)/maj accesses only the unit records which have weighted descriptors satisfying the set logic.

You realize that it would be cost-effective to use the data processing and data retrieval facet of T004 in your new search. However, the remainder of T004 would be irrelevant. DIALOG provides commands to remove facets of a saved search for re-use in another search. The command providing maximum flexibility is: .Exs t_ _ _/m-n, where m is the first numbered step in a sequence of steps to be .EXECUTE-ed, and n is the last numbered step desired from that same sequence. For example, .Exs t_ _ _/52-55 uses 4 steps from 52 through 55.

Reproduced below are the first two facets of the original search now saved as T004.

```
? ss data/ti,de,id or information/ti,de,id or computer?/ti,de,id

          1 24002 DATA/TI,DE,ID
          2 21946 INFORMATION/TI,DE,ID
          3 11273 COMPUTER?/TI,DE,ID
          4 49353  1 OR 2 OR 3
? ss processing/ti,de,id or file?  ?/ti,de,id or bank? ?/ti,de,id or system? ?/ti,de,id

          5  4997 PROCESSING/TI,DE,ID
          6   303 FILE? ?/TI,DE,ID
          7   458 BANK? ?/TI,DE,ID
          8 24165 SYSTEM? ?/TI,DE,ID
          9 27997  5 OR 6 OR 7 OR 8
? ss s9 or retrieval/ti,de,id or base? ?/ti,de,id or management/ti,de,id

         10  2753 RETRIEVAL/TI,DE,ID
         11  8433 BASE? ?/TI,DE,ID
         12 11125 MANAGEMENT/TI,DE,ID
         13 42883  9 OR 10 OR 11 OR 12
? ss s13 or storage/ti,de,id
```

102

You wish to combine logically the computer or manual data processing and data retrieval facet with the title or descriptor terms: mathematical model, mathematical models, mathematical modeling, mathematical modelling and mathematically modelled. You then plan to AND the results with the following facets:

A	B
ecology	cycle
ecological	cycles
ecosystem	cyclic
ecosystems	cyclical
synecology	sequence
synecological	sequences
	sequential
	succession
	successions
	successional
	period
	periods
	periodicity
	change
	changes
	changing
	climax
	climaxes
	dynamic
	dynamics

You wish to limit the terms of facet B to titles and descriptors only, thereby avoiding false drops from the occurrance of these general terms in abstracts. You will truncate terms where a check in appropriate dictionaries indicates that truncation will not result in false drops. You plan to sample 5 unit record titles and descriptors resulting from search strategy. If relevant, you plan to print online the 15 most recently added unit records, using the bibliographic format. You will then print the remainder offline. You will save the search for the day, print the remaining records offline and terminate the session for a brief time.

Write this search plan on the attached page. Also plan a strategy for broadening and narrowing the search, without adding extra terms.

THE NTIS DATABASE

The NTIS (National Technical Information Service) database is related to the publication Government Reports Announcements. An NTIS search is used to locate technical reports, and hence is primarily of use for applied rather than fundamental topics.

In addition to being the name of a database, NTIS is used as the designation for the U.S. government agency that publishes and distributes technical reports as well as Government Reports Announcements, Government Reports Index, the NTIS database, and other products. NTIS receives reports from government agencies, universities, and other organizations engaged in research that is funded by various U.S. government sources, and then distributes the reports to libraries and other purchasers. Most of these reports describe research or development activities, but bibliographies, directories, manuals, and numerous other types of publications are also included. Interim as well as final reports are distributed by the system.

A person searching the NTIS database by computer has many search options, including author, contract number, report number (1), and others. For the purposes of this exercise, we shall concentrate on subject related entry points: title terms, descriptors, identifiers, and subject category codes. If the search is to be performed on DIALOG, it is significant to note that corporate source terms are also in the basic index.

Because NTIS draws its source documents (the technical reports), and documentation and indexing of those documents, from a number of different government agencies, the NTIS database displays less consistency than is customary for databases prepared under the more complete control of a single agency. This is especially manifest in the use of so-called "controlled vocabulary" descriptors. Different agencies rely on different thesauri. As a consequence, the descriptors may be chosen from any one of several thesauri, the most important ones being DDC Retrieval and Indexing Terminology, INIS Thesaurus, ERDA Subject Indexing and Retrieval Thesaurus, NASA Thesaurus, and the Thesaurus of Engineering and Scientific Terms. For each document, major and minor descriptors are assigned (from the same vocabulary). Major descriptors, which reflect the principal concerns of the document, appear as index terms in Government Reports Announcements, but minor descriptors do not.

For DIALOG searching, the searcher may specify that a search term be a descriptor (either major or minor) as in SLIBRARIES/DE or that the term be a major descriptor (only) as in SLIBRARIES/DE*. Single words or phrases may be descriptors. A single word descriptor may be specified as such as in SLIBRARIES/DF and in SLIBRARIES/DF*. With suffix DE, the word may be either a single word descriptor or a word from a descriptor phrase.

The other basic index fields are for identifier, title, and corporate source terms. The identifiers are index terms not assigned from a controlled vocabulary, and may be major or minor, single word or phrase. Suffixes ID, ID*, IF, and IF* parallel those for descriptors. Corporate source terms may sometimes cause significant amounts of irrelevant retrieval because there are numerous agencies which produce vast numbers of technical reports and which have words in their names that are candidates as search terms, e.g.

"environment?", which would retrieve Environmental Protection Agency, if unqualified. The searcher should exercise caution in choosing terms, and use appropriate suffixes whenever there is danger of irrelevant retrievals due to corporate source names.

Subject codes have also been assigned to NTIS entries. COSATI codes have been assigned in every case, and are listed on page 6-11 in the Guide to DIALOG - Databases. NTIS codes have only been assigned in more recent years and can be located in NTIS Subject Classification (Past and Present), which also lists the COSATI codes. The codes are a mixed bag, but many of them are rather broad subjects, e.g., "meteorology", "physical chemistry", or "power sources." As such, they can sometimes be used effectively to introduce a broad facet into a search, or possible to limit a search for which too many postings would otherwise be retrieved. However, codes are not used in all searches. Indeed, the use of codes is the exception rather than the rule, but should not be overlooked when the need arises.

Additional details can be found in the appropriate section of the Guide to DIALOG - Databases. Some hints for searching NTIS may also be found in A Reference Guide to the NTIS Bibliographic Data File published by NTIS in 1977 (NTIS/SR-77/05).

(1.) "The contract number is the numeric identifier of the contract, grant, or order cited in the report which designates the financial support of the report."

"The report number may be the unique number assigned to the report by the corporate author or originating agency, or it may be the unique number assigned to the report by an agency other than the originating agency. Both types of report number may appear on the same document." From Guidelines for Descriptive Cataloging of Reports. A Revision of COSATI Standard for Descriptive Cataloging of Government Scientific and Technical Reports, published by the Committee on Information Hang-Ups Working Group on Updating COSATI, Washington, D.C., March 1978. (PB-277 951, AD-A050 900). Other definitions relevant to NTIS may also be found in this report.

THE NTIS DATABASE

Exercise 1

A search topic is provided below for use on File 6. Use this sheet, and any additional sheets as needed, to prepare a search plan to be executed on DIALOG's version of the NTIS database. Cite the publications used in preparing the search plan.

After discussing the terms or search strategy with your instructor, make an appointment to do your search. You will request an offline print of up to thirty citations. When the PRINT command has been confirmed by DIALOG, LOGOFF, and turn in your search record. The bibliography, printed offline, will be given to you by your instructor during Laboratory V.

Search Topic:

A marine biologist is preparing a grant proposal on developing an innovative method for farming marine algae. He needs to know about government research on this subject, and is particularly interested in the cultivation of kelp.

Exercise 2

A search topic is provided below for use on File 6. Use this sheet, and any additional sheets as needed, to prepare a search plan to be executed on DIALOG's version of the NTIS database. Cite the publications used in preparing the search plan.

After discussing the terms or search strategy with your instructor, make an appointment to do your search. You will request an offline print of up to thirty citations. When the PRINT command has been confirmed by DIALOG, LOGOFF, and turn in your search record. The bibliography, printed offline, will be given to you by your instructor during Laboratory V.

Search Topic:

A researcher is preparing a paper on methods of using waste glass. He wants bibliographies published on this subject. He is particularly interested in technical reports to research on methods of using waste glass as a component of paving material for roads.

Exercise 3

A search topic is provided below for use on File 6. Use this sheet, and any additional sheets as needed, to prepare a search plan to be executed on DIALOG's version of the NTIS database. Cite the publications used in preparing the search plan.

After discussing the terms or search strategy with your instructor, make an appointment to do your search. You will request an offline print of up to thirty citations. When the PRINT command has been confirmed by DIALOG, LOGOFF, and turn in your search record. The bibliography, printed offline, will be given to you by your instructor during Laboratory V.

Search Topic:

A consumer research company needs bibliographies of technical reports on microwave ovens. Their scientists are very interested in any government research on the effects of microwave radiation on human health.

Exercise 4

A search topic is provided below for use on File 6. Use this sheet, and any additional sheets as needed, to prepare a search plan to be executed on DIALOG's version of the NTIS database. Cite the publications used in preparing the search plan.

After discussing the terms or search strategy with your instructor, make an appointment to do your search. You will request an offline print of up to thirty citations. When the PRINT command has been confirmed by DIALOG, LOGOFF, and turn in your search record. The bibliography, printed offline, will be given to you by your instructor during Laboratory V.

Search Topic:

A graduate student is preparing a seminar paper on the applications of remote sensing in determining how much water will flow from an observed snowmass in mountainous regions. She is especially interested in government reports.

Exercise 5

A search topic is provided below for use on File 6. Use this sheet, and any additional sheets as needed, to prepare a search plan to be executed on DIALOG's version of the NTIS database. Cite the publications used in preparing the search plan.

After discussing the terms or search strategy with your instructor, make an appointment to do your search. You will request an offline print of up to thirty citations. When the PRINT command has been confirmed by DIALOG, LOGOFF, and turn in your search record. The biblicgraphy, printed offline, will be given to you by your instructor during Laboratory V.

Search Topic:

A chemist is interested in publications dealing with the applications of pattern recognition to chemical problems. Some of these deal with the interpretation of mass spectra, and, as he is already very familiar with this field, he wants to limit his search to those reports which do not treat mass spectra.

Exercise 6

A search topic is provided below for use on File 6. Use this sheet, and any additional sheets as needed, to prepare a search plan to be executed on DIALOG's version of the NTIS database. Cite the publications used in preparing the search plan.

After discussing the terms or search strategy with your instructor, make an appointment to do your search. You will request an offline print of up to thirty citations. When the PRINT command has been confirmed by DIALOG, LOGOFF, and turn in your search record. The bibliography, printed offline, will be given to you by your instructor during Laboratory V.

Search Topic:

The recent recipient of a Ph.D. in psychology has accepted a post-doctoral position with a research group that is concerned with human behavior during emergencies and disasters. He has been requested by the head of the group to review the literature dealing with simulation or mathematical modeling of the behavior of people in fires. The researcher wants to gether as many relevant documents and reports as he can, and he decided to begin his literature search with an online search of the NTIS database.

Exercise 7

A search topic is provided below for use on File 6. Use this sheet, and any additional sheets as needed, to prepare a search plan to be executed on DIALOG's version of the NTIS database. Cite the publications used in preparing the search plan.

After discussing the terms or search strategy with your instructor, make an appointment to do your search. You will request an offline print of up to thirty citations. When the PRINT command has been confirmed by DIALOG, LOGOFF, and turn in your search record. The bibliography, printed offline, will be given to you by your instructor during Laboratory V.

Search Topic:

A group of chemists working for an electronics firm are interested in techniques for growing crystals useful in semiconductor devices under near-zero gravity conditions, such as occur in space laboratories. They are also interested in the properties of such crystals. They are aware that government research has been carried out in this area and would like a bibliography of the most relevant reports.

Exercise 8

A search topic is provided below for use on File 6. Use this sheet, and any additional sheets as needed, to prepare a search plan to be executed on DIALOG's version of the NTIS database. Cite the publications used in preparing the search plan.

After discussing the terms or search strategy with your instructor, make an appointment to do your search. You will request an offline print of up to thirty citations. When the PRINT command has been confirmed by DIALOG, LOGOFF, and turn in your search record. The bibliography, printed offline, will be given to you by your instructor during Laboratory V.

Search Topic:

A writer for a trade journal has been assigned to write a series of feature articles on government-sponsored research concerning the production of methane from waste materials in California. Prior to conducting interviews and on-site visits, she would like to review relevant published reports.

PART IV

APPENDIX

SAMPLE ONLINE COMPUTER SEARCH

```
TELENET
213 58

TERMINAL=decw

@c 415 20

415 20 CONNECTED

ENTER YOUR DIALOG PASSWORD
KKKKKKKK
MMMMMMMM  LOGON File1 Wed 24oct79 13:48:00 Port001

FILE 77 IS OFFLINE...
OCT. IS LAST MONTH FOR NON-SUBSCRIPTION
USE OF NEWSEARCH (FILE 211).
FREE TIME IN OCTOBER ON FILE 114.  SEE
?NEWS.
? bb

         24oct79 13:48:14 User7380
  $0.08  0.005 Hrs file1*
File6:NTIS 64-79/ISS21
(Copr. NTIS)
         Set  Items  Description (+=OR;*=AND;-=NOT)
         ---  -----  ------------------------------
? ss farm? or aqu?cult? or mar?cult? or cultivate? or harvest?

           1   2685  FARM?
           2   1169  AQU?CULT?
           3     65  MAR?CULT?
           4     33  CULTIVATE?
           5    602  HARVEST?
           6   4343   1 OR 2 OR 3 OR 4 OR 5

? s alga?(f)marine

           7    313  ALGA(F)MARINE

? ss kelp/ti,de,id or seaweed?/ti,de,id or seagrass?

           8     25  KELP/TI,DE,ID
           9     71  SEAWEED?/TI,DE,ID
          10     14  SEAGRASS?
          11    106   8 OR 9 OR 10

? ss brown(w)alga? or phaeophy? or fucus or fuca or fucoid?

          12      7  BROWN(W)ALGA
          13     49  PHAEOPHY?
          14      6  FUCUS
          15     46  FUCA
          16      0  FUCOID?
          17    103   12 OR 13 OR 14 OR 15 OR 16
```

```
? ss s17 or fuca?

          18     48 FUCA?
          19    105  17 OR 18

? ss laminaria? or chlorella or macrocystis

          20      5 LAMINARIA?
          21    118 CHLORELLA
          22     11 MACROCYSTIS
          23    134  20 OR 21 OR 22

? c b and (7 or 11 or 19 or 23)

          24     49 b AND (7 OR 11 OR 19 OR 23)

? t 24/8/1-5

24/8/1
PB-290 101/5ST   NTIS Prices: PC A09/MF A01

Seaweed Research in Crop Production 1958-1978

Descriptors:  *Aquatic plants, *Algae, *Farm crops, *Horticulture,
*Growth regulators, Plant growth, Phaeophyta, Fucus, Fertilizers,
Spraying, Feeding stuffs, Byproducts, Germination, Seeds, Plant
physiology, South Carolina, Reviews

Identifiers:  Ascophyllum nodosum, Sargassum, Kelp, Plant extracts,
NTISCOMEDA

24/8/2
PB-286 070/8ST   NTIS Prices: PC A03/MF A01

Interacting Environmental Factors which Control the Sinking Rate of
Planktonic Algae

Descriptors: *Plant growth, *Light(Visible radiation), *Carbon dioxide
, *Algae, *Ecological succession, Water pollution, Bioassay, Rates(Per
time), Concentration(Composition), Photosynthesis, Plants(Botany),
Kinetics, Carbon dioxide cycle, Lagoons(Ponds), Aquaculture,
Interactions, pH

Identifiers:  *Water pollution effects(Plants), *Eutrophication,
Sinking, *Chlorella vulgaris, Carbon fixation, NTISDIOWRT

24/8/3

ERDA/USN/1027-3/2   NTIS Prices: PC A06/MF A01

Ocean Food and Energy Farm Project, Subtask 4. Preliminary Design
Studies of Substrate and Upwelling Systems. Volume 2. Artificial
Upwelling in Support of the OFEF Project. Progress Report
```

Descriptors: *Pumps, *Seawater, *Seaweeds, *Upwelling, Biomass plantations, Buoys, Comparative evaluations, Computer codes, Cultivation, Design, Equations of motion, Feasibility studies, Mathematical models, Mixing, Nutrients, Performance testing, Pipes, Pumping, Seas, Substrates, Supports, Turbines

Identifiers: ERDA/140504, Sea water, Phaeophyta, NTISDE

24/8/4
ERDA/USN/1027-76(V.2) NTIS Prices: PC A05/MF A01

Ocean Food and Energy Farm Project. Subtask No. 6: Systems Analysis, Volume 2. Cultivation Subsystem. Final Report

Descriptors: *Seaweeds, *Aquaculture, Biomass plantations, Seas, Building materials, Cost, Cultivation, Bultivation techniques, Design, Economics, Mechanical structures, Nutrients, Offshore platforms, Planning, Supports

Identifiers: ERDA/140504, ERDA/423000, *Phaeophyta, Mariculture, NTISDE

24/8/5
ERDA/USN/1027-2 NTIS Prices: PC A04/MF A01

Ocean Food and Energy Farm Project. Subtask 3. Dispersion and Sinking Studies for Oceanic Upwelling. Progress Report

Descriptors: *Seaweeds, Seawater, Cultivation, Plumes, Research programs, Upwelling

Identifiers: ERDA/140504, *Aquaculture, *Ocean currents, NTISDE

? t24/6/20-25

24/6/20
PB-255 386/5ST NTIS Price: PC A02
Antecedent Event Influence on Benthic Marine Algal Standing Crops in Hawaii
Pub. in Jnl. of Experimental Marine Biology and Ecology, v6 p161-166 1971.
1971 7p

24/6/21
PB-253 380/0ST NTIS Prices: PC A07/MF A01
Evaluating Oceanic Farming of Seaweeds as Sources of Organics and Energy
31 Jul 75 127p

24/6/22
PB-248 304/8ST NTIS Price: PC A02
Spatial Overlap and Competition in Congeneric Surgperches (Embiotocidae) Off Santa Barbara, California
Pub. in Copeia, 1975 n2 p352-356, 23 May 75.
23 May 75 7p

24/6/23
PB-247 182/9ST NTIS Prices: PC A04/MF A01

```
  Preliminary Results with a Pilot Plant Waste Recycling
Marine-Aquaculture System
  Sponsored in Part by Grant NOAA-04-5-158-8.
  Sep 75  61p

24/6/24
COM-75-10893/6ST   NTIS Prices: PC A02/MF A01
  Papermaking Potential of Zostera and Cladophora, Two Marine Weeds
  Sponsored in part by National Oceanic and Atmospheric
Administration, Rockville, Md. Office of Sea Grant.
  Feb 74  13p

24/6/25
COM-75-10530-4ST   NTIS Price: PC A02
  Effects of Water Wuality, Antibiotics, Phytoplankton and Food on
Survival and Development of Larvae of 'Scylla serrata' (Crustacea:
Portunidae)
  Pub. in Aquaculture, v3 p231-244 1974.
  13 Nov 73  15p

? end/savetemp

Serial #T14D
          24oct79 14:05:44 User7380
  $4.40  0.293 Hrs File 20  Descriptors
? logon

          24oct79 14:06:02  User7380
  $0.09  0.006 Hrs File6

LOGOFF 14:06:02

ENTER YOUR DIALOG PASSWORD
********
********** LOGON  File1 Wed 24oct79 14:06:14 Port0D1

FILE 77 IS OFFLINE...
OCT. IS LAST MONTH FOR NON-SUBSCRIPTION
USE OF NEWSEARCH (FILE 211).
FREE TIME IN OCTOBER ON FILE 114.  SEE
?NEWS.
? b6

          24oct79 14:06:26 User8533
  $0.13  0.005 Hrs File1*
  $0.03  Telenet
  $0.16  Estimated Total Cost
File6:NTIS 64-79/ISS21
(Copr. NTIS)
          Set Items Description (+=OR;*=AND;-=NOT)
          --- ----- ---------------------------

? .execute steps t14d/user 7380
```

113

```
          1  2685 FARM?
          2  1169 AQU?CULT?
          3    65 MAR?CULT?
          4    33 CULTIVATE?
          5   602 HARVEST?
          6  4343  1 OR 2 OR 3 OR 4 OR 5
          7   313 ALGA?(F)MARINE
          8    25 KELP/TI,DE,ID
          9    71 SEAWEED?/TI,DE,ID
         10    14 SEAGRASS?
         11   106  8 OR 9 OR 10
         12     7 BROWN(W)ALGA?
         13    49 PHAEOPHY?
         14     6 FUCUS
         15    46 FUCA
         16     0 FUCOID?
         17   103  12 OR 13 OR 14 OR 15 OR 16
         18    48 FUCA?
         19   105  17 OR 18
         20     5 LAMINARIA?
         21   118 CHLORELLA
         22    11 MACROCYSTIS
         23   134  20 OR 21 OR 22
         24    49  6 AND (7 OR 11 OR 19 OR 23)
? pr24/5/1-49

Printed24/5/1-49
? logoff hold

        24oct79 14:15:27 User8533
  $5.32  0.152 Hrs Files 20 Descriptors
  $0.76  Telenet
  $4.90  49 Prints
 $10.98  Estimated Total Cost

LOGOFF 14:15:33

415 20 DISCONNECTED 0:27:48 175 27
```

SAMPLE OFFLINE COMPUTER PRINTOUT

DIALOG File6: NTIS 64-79/ISS22 (Copr. NTIS) (Item 8 of 25) User 8533 1nov79

Biological Effects of Microwaves. Volume 2. 1978-May, 1979 (A Bibliography with Abstracts)

National Technical Information Service, Springfield, VA. (391 812)

Rept. for 1978-May 79
AUTHOR: Harrison, Elizabeth A.
F119113 Fld: 6R,6J,57V*, 57U, 68G, 68F, 86W GRA17914
May 79 51p*
Monitor: 18
Supersedes NTIS/PS-78/0432, NTIS/PS-77/0455, NTIS/PS-76/0387, and NTIS/PS-75/384. See also Volume 1, 1964-1977, NTIS/PS-79/0432.

Abstract: The selected abstracts cover the biological effects on man and animals from exposure to microwaves. In addition to dosages and tolerances, regulations, and standards are included. (This bibliography contains 45 abstracts, 29 of which are new entries to the previous edition.)

Descriptors: *Bibliographies, *Microwaves, *Radiation effects, *Health physics, Radiobiology, Electromagnetic radiation, Humans, Animals, Standards, Radiation dosage, Radiation tolerance, Exposure, Radiation injuries, Industrial medicine, Industrial hygiene, Abstracts

Identifiers: Environmental health, *Occupational safety and health, Biological effects, NTISNTIS

NTIS/PS-79/0433/7ST NTIS Prices: PC N01/MF N01

Biological Effects of Microwaves. Volume 1. 1964-1977 (A Bibliography with Abstracts)

National Technical Information Service, Springfield, VA. (391 812)

Rept. for 1964-77
AUTHOR: Harrison, Elizabeth A.
F119112 Fld: 6R,6J,57V*, 57U, 68G*, 68F, 86W GRA17914
May 79 212p*
Monitor: 18

Abstract: The selected abstracts cover the biological effects on man and animals from exposure to microwaves. In addition to dosages and tolerances, regulations, and standards are includes. (This updated bibliography contains 204 abstracts, none of which are new entries to the previous edition.)

Descriptors: *Bibliographies, *Microwaves, *Radiation effects, *Health physics, Radiobiology, Electromagnetic radiation, Humans, Animals, Standards, Radiation dosage, Radiation tolerance, Exposure, Radiation injuries, Industrial medicine, Industrial hygiene, Abstracts

Identifiers: Environmental health, *Occupational safety and health, Biological effects, NTISNTIS

NTIS/PS-79/0432/9ST NTIS Prices: PC N01/MF N01

Effect on Mice of Microwaves in the Non-Thermal Intensity Region. Respiration, Rectal Temperature and Mental Reaction Inverkan Paa Moess AV Mikrovaagor Inom Detickettermiska Intensiteisomfaadet. Andning, Rektal temperatur och Sinnesreaktion

Research Inst. of National Defence, Stockholm (Sweden).
AUTHOR: Criborn, C. O.
F0992L2 Fld: 6R, 6F, 57V, 68F STAR1708
Jan 78 23p
Rept No: FOA-C-54021-H2(H6)
Monitor: 18
Language: SWEDISH
Text in Swedish.

Abstract: The effect of microwaves (2450 MHz) on respiration, rectal temperature and mental reaction to sound was studied using an intensity of 10 mW/sq cm for 30 minutes. The result shows that both respiration and reaction to sound deteriorated during exposure, while the rectal temperature was unaffected. Previous investigations carried out in the same way but at an intensity of 100 mW/sq cm for three minutes provided the opportunity to study the relationship between doses for two

different intensities and a total dose of 300 mW.min./sq cm. It is shown that initially the respiration volume per minute decreases during exposure at both intensities, but that thermoregulation is cut out after approximately two minutes' exposure at 100 mW/sq cm; this leads to a rise in rectal temperature. At 10 mW/sq cm the rise in temperature is counteracted throughout the exposure period by a decrease in the respiration volume per minute. The value of the reaction to sound, normalized to the respiration volume per minute, is affected at both intensities.

Descriptors: *Body temperature, *Microwaves, *Radiation effects, *Respiration, Human reactions, Biological effects, Mice, Noise(Sound), Physiological effects, Radiation dosage, Stress (Physiology)

Identifiers: Health physics, NTISNASAE

N79-17523/8ST NTIS Prices: PC A02/MF A01

GUIDES TO THE LITERATURE

GUIDES TO THE LITERATURE

A. GENERAL GUIDES, INCLUDING GUIDES TO SCIENCE, SOCIAL SCIENCE, OR ENGINEERING LITERATURE AS A WHOLE.

International Compendium of Numerical Data Projects. A Survey and Analysis. Produced by CODATA. New York, Springer-Verlag, 1969. 295 p. (Ref Q 223 I54).

Jaeger, Herman de. Science Information Sources. 2d ed. Nijmegen, Association Scientifique et Technique pour la Recherche en Informatique Documentaire. 1974. (Ref Z 1002 J25 1974).

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The library has pathfinders for a lot of specific, high-interest topics. Inquire at the SEL Reference Desk.

B. ASTRONOMY

Kemp, D. Alasdair. Astronomy and Astrophysics. London, Macdonald Technical and Scientific, 1970, 584 p. (Ref Z 5151 K45).

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C. BIOLOGY

Blackwelder, Richard Eliat. Guide to the Taxonomic Literature of Vertebrates. Ames, Iowa, State University Press, 1972, 259 p. (Ref Z 7996 V4 B5).

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Smith, Roger Cletus, and W. Malcolm Reid. Guide to the Literature of the Life Sciences. 8th ed. Minneapolis, Burgess, 1972, 166 p. (Ref Z 5320 S57 1972).

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Weiser, Virginia. General Biological Sciences Including Biochemistry and Biophysics; Guide to the Literature in the UCSB Library. Santa Barbara, Sciences-Engineering Library, University of California, 1974, 37 p., (also distributed in SEL), (Ref Z 5320 W45).

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Peck, Theodore P. Chemical Engineers' Guide to Information Sources. Minneapolis, Dept. of Chemical Engineering and Materials Science, University of Minnesota, 1973, 194 p. (Ref Z 7914 C4 P43).

E. CHEMISTRY

Antony, Arthur. Guide to Basic Information Sources in Chemistry. New York, Wiley, 1979, 219 p. (Ref QD 8.5 A57 1979).

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Woodburn, Henry Milton. Using the Chemical Literature, A Practical Guide. New York, M. Dekker, 1974, 302 p. (Ref QD 8.5 W66).

F. COMPUTER SCIENCE

Carter, Ciel Michele. Guide to Reference Sources in the Computer Sciences. New York, Macmillan Information, 1974, 237 p. (Ref QA 76 C3617).

Pritchard, Alan. A Guide to Computer Literature. Hamden, Conn. Linnet Books, 1972, 194 p. (Ref Z 6654 C17 P7 1972).

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Burkett, Jack and Philip Plumb. How to Find out in Electrical Engineering. Oxford, Pergamon, 1967, 234 p. (Ref TK 153 B8).

Rankle, Gretchen R. Electronic Industries, Information Sources. Detroit, Gale, 1968, 227 p. (Ref Z 5836 R3).

H. ENVIRONMENTAL STUDIES

Burke, John Gordon, and Jill Swanson Reddig. Guide to Ecology Information and Organizations. New York, H. W. Wilson, 1976, 292 p. (Ref Z 5861 B87).

Fitzpatrick, Connie. A Selected List of Current Government Publications Dealing with Pollution. Vancouver, B.C., University of British Columbia Library, 1974, 77p. plus Supp. no. 1, 1974, 30 p. (Ref Z 5862 F58).

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K. GEOLOGY

Mackay, John Watson. Sources of Information for the Literature of Geology. London, Geological Society of London, 1973, 61 p. (Ref QE 40 M32).

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M. INFORMATION AND LIBRARY SCIENCE

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O. MECHANICAL ENGINEERING

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P. MEDICINE

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Q. METALLURGY

Hyslop, Marjorie R. A Brief Guide to Sources of Metals Information. Washington, Information Resources Press, 1973, 180 p. (Ref TN 675.4 H95).

R. OCEANOGRAPHY

Aron, William. A Survey of the Oceanographic Literature of the Santa Barbara Channel Area. Santa Barbara, Calif., 1962, 230 p. (Ref Z 6004 P6 G4).

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S. PHARMACY

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